THE MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—32ND YEAR. SYDNEY, SATURDAY, APRIL 7, 1945. No. 14.

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DIARRHŒAL DISEASES IN NEW GUINEA.

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THE all-important cause of diarrhœa found in troops in New Guinea is acute bacillary dysentery. In the following review of cases seen at an Australian general hospital, which will include a detailed analysis of 503 consecutive cases of diarrhœa, particular emphasis is laid on the diagnosis and treatment of this disease, with brief reference only to diarrhœa due to other causes.

During the past eighteen months this hospital has treated 2,849 patients suffering from bacillary and amœbic dysentery. There have been no deaths. In the earlier months, when only severe bacillary dysentery was treated with sulphaguanidine, the incidence appeared to be higher than in the last twelve months, when sulphaguanidine was available for the treatment of all patients suffering from acute diarrhœa.

TABLE I.
Distribution of 2,849 Cases, from September, 1942, to February, 1944, Inclusive.

Type of Disease.	Number of Cases.	Percentage.
Bacteriologically proven bacillary dysentery	1,026	36·0
Diagnosis bacteriologically unproven ..	1,784	62·6
Amœbic dysentery	39	1·4

The 1,026 strains of dysenteric organisms isolated were distributed as follows: *Bacterium dysenteriæ* Shiga, 137 (13·4%); *Bacterium dysenteriæ* Flexner, 780 (78·0%); *Bacterium dysenteriæ* Schmitz (*ambiguum*), 82 (8·0%); *Bacterium dysenteriæ* P274 (Boyd IV), 24 (2·4%); *Bacterium dysenteriæ* Sonne, 3 (0·2%).

The majority of patients were received from units within thirty miles of the hospital area. Camps were situated in isolated areas in small valleys and were adjacent to rivers in many instances. All drinking water was chlorinated, generally at individual camp sites. Deep trench latrine systems were universal. Other patients were received from operational areas far afield, but by means of air transport, many arrived within four or five days of the onset of their illness.

It is our firm conviction that in this area acute diarrhœa, with few exceptions, is bacillary dysentery. Consequently all patients were isolated and treated as suffering from bacillary dysentery, whether bacteriological proof was obtained or not. This will be discussed more fully in a later section.

The 39 cases of amœbiasis were proved by the finding of vegetative forms of *Entamœba histolytica* in 27 cases and cystic forms in 12 cases. From this low incidence (1·4%) it is seen that amœbic dysentery did not present a serious problem. Although most of these cases came from certain areas on the island, our figures give no indication of the incidence in any particular region of New Guinea. It is probable that thorough investigation of recurrent diarrhœa in troops returning to the mainland will disclose further cases, and such investigation is important.

Diarrhœa was not a feature of the Salmonella infections we encountered. These were predominantly septicæmic illnesses, and diarrhœa, when present, was transient, and was overshadowed by the frequently severe nature of the illness. One case due to *Bacterium typhi-murium* (*Bacterium aertrycke*) was interesting because the onset and clinical features, except for persistent epigastric pain, were similar to those of acute Flexner or Shiga dysentery.

This was an isolated case, possibly due to the consumption of a paste sandwich seven hours before.

An officer, aged forty-one years, was admitted to hospital suffering from severe epigastric pain and diarrhœa. After sixteen hours he felt much better and the diarrhœa ceased; but five days later mild diarrhœa recurred, and *Bacterium aertrycke* was isolated from greenish glairy mucus in the stools. For the next ten days the temperature was up to 101° F. and then subsided gradually. Three weeks later, although he was well and without diarrhœa, stool cultures still yielded a growth of *Bacterium aertrycke*.

Although we do not believe that sulphaguanidine has any bacteriostatic effect on Salmonella organisms, this patient felt more comfortable after its use in the initial stages of his illness.

In cases of malignant tertian malaria we encountered no diarrhœa which could be attributed to the severity of the infection; but in a review of 1,000 cases of malaria in this area, Williams[1] noted that in 64 bacillary dysentery was coincidental to the malarial infection.

In scrub typhus, Williams, Sinclair and Jackson[2] found that 68 out of 626 patients, particularly those with the disease in severe form, passed fluid stools during that phase of the illness when fever and toxæmia were at their height. Seven patients passed blood and mucus, and dysenteric organisms were isolated from the stools of five of them. At this time dysentery was prevalent amongst troops who came down with typhus, and it was often difficult to decide whether diarrhœa was due to the Rickettsial infection or to complicating bacillary dysentery.

Nervous or psychogenic diarrhœa occurred in a small percentage of cases. It was often difficult to differentiate these cases from cases of bacillary dysentery and post-dysenteric diarrhœa of psychogenic origin; but a careful history usually revealed the emotional background of the "utterly dependent individual".

Non-specific ulcerative colitis was extremely rare.

One patient had suffered from chronic diarrhœa for two years, and his condition was not improved by four courses of sulphaguanidine in forward areas. Repeated stool investigations gave negative results, and sigmoidoscopic examination of the lower bowel revealed normal mucosa; but the X-ray appearances after a barium enema were suggestive of ulcerative colitis.

There were at this hospital no cases of diarrhœa attributable to the intestinal flagellates or intestinal protozoa other than *Entamœba histolytica*.

Analysis of 503 Consecutive Cases of Diarrhœa.

Five hundred and three consecutive cases of diarrhœa were the subject of more detailed investigation, and it is proposed to discuss them more fully. In all cases the treatment was along lines (now a routine at this hospital) laid down by Fairley and Boyd[3]—namely, that every dysentery patient must receive sulphaguanidine, adequate in amount, at the earliest possible moment without regard to laboratory investigation. Not only does this procedure save the lives of seriously ill patients, but it lessens the period of stay in hospital of all patients, for it is important that troops in forward areas be returned to duty as soon as possible. Thus, unlike Paulley,[4] Bulmer and Priest[5] and others, we can make no comparison between sulphaguanidine and other sulphonamides in the treatment of bacillary dysentery.

The information most necessary from the laboratory in bacillary dysentery is the nature of the pathogen concerned. This knowledge is of value to the physician in assessing the prognosis, the period for which sulphaguanidine will be required and the arrangement of beds in his ward to eliminate chances of cross-infection. It is recognized that bacillary dysentery may be treated with reasonable safety by relying on clinical judgement alone, with the aid if possible of sigmoidoscopic examination; but few will deny that valuable help is obtained from a laboratory. In order to improve, if possible, the isolation of dysenteric organisms, a routine rectal swabbing for cultural examination was taken from each patient on his admission to hospital, in addition to the carrying out of the usual stool investigation.

For the purposes of this survey most of the patients were examined with the sigmoidoscope on the day after their admission to hospital. This is not a routine procedure in this hospital at this early stage in the disease; but it was carried out with due care in this instance only.

Table II.
Classification of 503 Consecutive Cases.

Type of Disease.	Number of Cases.	Percentage.
Bacillary dysentery ..	474	94·2
Amœbic dysentery ..	15	2·9
"Nervous diarrhœa" ..	14	2·9

Of the 474 cases of bacillary dysentery listed above, 260 or 54% were bacteriologically proved, the dysenteric organisms found being *Bacterium dysenteriæ* Shiga in 56 cases, *Bacterium dysenteriæ* Flexner in 179, *Bacterium dysenteriæ* Schmitz (*ambiguum*) in 23, and *Bacterium dysenteriæ* P274 (Boyd IV) in two.

Bacillary dysentery in this series, with early and adequate treatment, was a mild condition. If the severity is judged by symptoms, fever, number of stools at the onset, sigmoidoscopic findings and progress of the condition, the 474 cases in this series were distributed as shown in Table III.

Table III.
Severity of Bacillary Dysentery in 474 Cases.

Type.	Mild.		Moderate.		Severe.	
	Number of Cases.	Percentage.	Number of Cases.	Percentage.	Number of Cases.	Percentage.
Shiga	23	41·0	23	41·0	10	18·0
Flexner ..	106	59·2	63	35·2	10	5·6
Schmitz	15	65·0	8	35·0	—	—
P274	1	50·0	1	50·0	—	—
Bacteriologically unproved ..	152	71·0	61	28·5	1	0·5
Total ..	297	62·7	156	32·9	21	4·4

Sulphaguanidine Treatment.

Immediately after the patient's admission to hospital, sulphaguanidine was administered. The initial dose was seven grammes, followed by 3·5 grammes five times a day for the first four days and then 3·5 grammes three times a day for three days. Thus a total of 105 grammes was given in seven days.

This was the routine dosage for all patients and was not varied except by the medical officer. No alteration of dosage was made relative to the number of stools in the first six days. This simplified procedure for the nursing staff. In some cases of moderate or severe Shiga dysentery, and occasionally when progress appeared to be slow, administration was extended to nine days.

The average dosage of sulphaguanidine in the present series is shown in Table IV.

Table IV.
Dosage of Sulphaguanidine.

Type of Disease.	Number of Cases.	Average Dose in Grammes.
Shiga	56	154
Flexner	179	122
Schmitz	23	118
P274	2	122
Bacteriologically unproved dysentery	215	106

In the majority of cases the patient feels well and the number of stools over the next few days rapidly settles

to normal. This rapid and often dramatic cessation of diarrhœa makes it difficult to obtain stool specimens for perhaps several days, by which time the bacteriological examination may well give negative results. Herein lies one outstanding advantage of cultural examination of a rectal swab over cultural examination of stools.

In the analysis of the reasons why 44 patients in this series with an average of two to four stools per day were given extra courses of sulphaguanidine, it is found that fourteen were carriers, thirteen had the disease in a severe form and responded slowly (one double infection of Shiga and Flexner is included), and seventeen patients were still suffering from diarrhœa, although the bacteriological findings were normal, while sigmoidoscopic examination showed the mucosa to be more hyperæmic than normal. It is doubtful whether the extra course of sulphaguanidine treatment was warranted in the latter group. It must be recognized that, even if the infection has been controlled by full doses of sulphaguanidine, the bowel may still be in a process of healing, so that two or three bowel actions per day between the seventh and eleventh days are not necessarily an indication for repeating the course of sulphaguanidine treatment.

Earlier experience showed that amounts of 50 to 60 grammes seemed inadequate to control the infection and repeated courses were required in too many cases. In addition, such patients tend to become carriers. A technical instruction issued to medical officers in forward areas in New Guinea directs that all patients with diarrhœa who report to the regimental aid post be given a five-day course of sulphaguanidine totalling at least 90 grammes, even if symptoms have disappeared within the first forty-eight hours. Analysis of a small series of bacteriologically proved cases in which swabs were examined every day for ten days shows the need for such measures. The figures for this series are given in Table V.

The dosage of sulphaguanidine over the first eight days was as follows: 12·7 grammes (first day), 17·5 grammes (second, third, fourth and fifth days), 10·5 grammes (sixth, seventh and eighth days). The total dosage was 114 grammes.

Diet.

Ample fluids with glucose were given, the aim being a urinary output of 1,500 cubic centimetres per day. Food was allowed from the outset, and there were two standard diets. For the first four days patients were given the hospital light diet, and from the fifth day onwards a general hospital diet with meat, fish and vegetables was allowed. This standardization of diet simplified matters for the nursing staff, especially when the daily food requirements for the ward were being ordered. Some patients, medical officers with Flexner dysentery included, were given normal army diet from the outset, and there was no noticeable ill-effect except for an obvious disinclination for food in the first twenty-four hours.

Ancillary Measures.

Dehydration was not a difficult factor to control, and intravenous therapy was unnecessary, since vomiting was rarely persistent and oral intake of fluids was satisfactory. There was a single exception, a patient suffering from neglected Shiga dysentery and seen by one of us; one would empirically state that the intravenous administration of saline solution, and sulphaguanidine, saved his life.

Shiga dysenteric antiserum was not used. Indeed, with the exception of the patient just mentioned and one other patient suffering from acute neutropenia, no patient was placed on the "seriously ill" list.

Patients were confined to bed with complete rest until they had remained afebrile for twenty-four hours, and were not permitted to leave the ward in the first five days. Those suffering from severe colicky pain were given morphine.

As ample supplies of sulphaguanidine are available, we believe, in agreement with Bulmer and Priest,[5] that there is no place for the use of purgatives. Patients feel more restful without a flushing out of the lower bowel with saline solution, and such treatment was discontinued in this hospital twelve months ago. We still encountered cases in which castor oil or sodium sulphate had been used in the initial phases of treatment, even when sulphaguanidine was available in adequate amounts, and we strongly disapproved. It is the early administration of this drug which promotes rapid recovery and makes the patient more comfortable.

Outline of Laboratory Investigation.

In the general nursing and treatment of dysentery patients we instituted a simple routine which applied to the great majority of patients and which worked smoothly and efficiently when the number of patients increased considerably at any one time. So with laboratory investigation we adopted similar standard methods.

Each morning, at the commencement of his daily work, the medical officer attended the sigmoidoscopic room and took swabs from all patients who appeared to be clinically cured. A proctoscope was used and swabs were taken under direct vision. Then swabs were taken from all new patients admitted during the previous day; swabs were taken from patients who were ill in their beds. All swabs were plated immediately on desoxycholate-citrate agar plates by a laboratory technician in attendance.

It has been pointed out in a previous communication[6] that the immediate administration of sulphaguanidine does not appreciably diminish the chance of isolating dysenteric organisms from either stool or swab on the day after admission to hospital, when up to 17·5 grammes of the drug may have been given. We obtained more positive cultural results from swabs than from stools, as did Roberts and Daniels;[7] but a large share of this superiority was due to the fact that an early stool specimen was not obtained from all patients owing to the rapid cessation of diarrhœa with sulphaguanidine treatment.

The first three stools passed by a new patient were examined by trained orderlies, descriptions were entered on the patient's case sheet, and whole bed-pan specimens were taken to the laboratory with the minimum of delay. The fact that whole-stool specimens were dealt with throughout this survey was an advantage made possible because the mobile laboratory was drawn up alongside the dysentery wards and devoted most of its time to this work. The

TABLE V.

Results of Daily Cultural Examination of Rectal Swabs.

Case Number.	Type of Infection.	Day.									
		1	2	3	4	5	6	7	8	9	10
I	Flexner	+[1]	+	−[1]	−	−	−	−	−	−	−
II	Flexner	+	+	−	−	−	+	−	−	−	−
III	Flexner	+	−	−	+	−	−	−	−	−	−
IV	Flexner	+	+	+	−	−	−	−	+	−	−
V	Flexner	+	+	−	−	−	−	−	−	−	−
VI	Flexner	+	+	+	+	−	−	−	−	−	−
VII	Flexner	+	+	+	+	−	−	−	−	−	−
VIII	Schmitz	+	+	−	−	−	−	−	−	−	−
IX	Flexner	+	+	+	+	+	+	+	−	−	−
X	Flexner	+	+	+	−	−	−	−	−	−	−

[1] "+" = positive result to cultural examination; "−" = no pathogens isolated.

procedure adopted with stool specimens was to wash them in saline solution and attempt culture of any mucus present. No cultural examination was attempted of stools containing no mucus.

Thus a rectal swabbing and one or more stools from each new patient were received by the laboratory. Although its advisability may be questioned, we consider that reliance on rectal swabbing alone for the diagnosis of bacillary dysentery is sufficient and will simplify both laboratory and ward work. The transport of infective material from ward to laboratory, which may be in the hands of careless personnel (for example, the patient himself), is largely eliminated; moreover, more prompt attention is given and more time is available in the laboratory for the examination of stools in cases of suspected amœbic dysentery. This is one of the most important functions of the laboratory in dysentery work.

When in the opinion of the medical officer a patient appeared to be clinically cured, sigmoidoscopy was performed. If the bowel appeared normal, a rectal swabbing was taken and material was plated on desoxycholate-citrate agar. If the cultural examination produced negative results, the patient was discharged from hospital. Experience showed that it was a waste of time to perform sigmoidoscopy in cases of Shiga dysentery before the fourteenth day of the disease and in cases of Flexner dysentery before the ninth or tenth day, since before these periods pathological changes were still present in the bowel mucosa.

We are not satisfied that negative results from the examination of one final swab denotes bacteriological cure, and consider that three consecutive negative results from inoculation of swab material on desoxycholate-citrate agar are advisable; but lack of media prevented us from making more such examinations. In these circumstances it is doubtful whether it is worth examining a final swab; but for the purposes of this survey it did provide some information which will be detailed later.

Clinical Aspects.

We do not propose to discuss the symptoms and signs in bacillary dysentery, but wish to point out some salient features noted in the reviewing of cases in this area. Table VI shows the clinical response in all cases.

Shiga Dysentery.

Of the 56 cases of Shiga dysentery not more than four cases came from a single unit; this was in contrast to Flexner outbreaks, in which as many as 30 cases came from the same camp area at once.

The temperature ranged from 100° to 103° F. and the rise usually lasted for three to five days, so that patients were kept in bed for an average of six days. Apart from the distressing frequency of bowel actions, the main complaint was colicky abdominal pain. This seemed so characteristic of Shiga dysentery that two patients suffering from acute obstructive appendicitis with brief initial diarrhœa were sent to the dysentery ward, and the true cause was not apparent until next morning.

Thirty-three consecutive patients with acute Shiga dysentery were sigmoidoscopically examined by the same observer on the second day in hospital. In thirteen cases the mucosa was strawberry-red in colour, œdematous and partly covered with mucus. In twenty cases the inflammation was more intense, the mucus was blood-stained, and small, bleeding, ulcerated areas were present. In one severe case the ulcers were covered by fibrin, which left a yellowish bleeding raw area when separated. This case is of interest, in that it was our only case of Shiga dysentery in which examination of a rectal swab in the convalescent stage gave positive results.

A craftsman, aged twenty-three years, was admitted to hospital with a history of vomiting, headache, fever, intense colicky abdominal pain and urgent diarrhœa of sixteen hours' duration. The onset was sudden, and he passed at least twenty stools before his admission to hospital. The stools contained blood and mucus, from which Shiga organisms were isolated. Sulphaguanidine treatment was commenced immediately, and morphine was necessary at intervals over the first three days to relieve his pain. There was no apparent dehydration, and fluids given by mouth were well tolerated. He had a ten-day course of sulphaguanidine, the dosage totalling 175 grammes. By the ninth day he was still passing an average of fifteen stools per day and ulcers about one centimetre in diameter were present in the lower bowel. The stool rate suddenly dropped to two on the eleventh day. Within the next few days the stools became normal and remained so. On the seventeenth day of the disease examination of a rectal swab still yielded a positive result. A further course of sulphaguanidine, totalling ninety grammes in five days, was given; by this time the sigmoidoscopic appearances were normal, and the examination of three consecutive rectal swabs gave negative results. The patient's total stay in hospital was 38 days.

We believe that this patient would have fared much worse without sulphaguanidine, and have already cited another case of severe Shiga dysentery in which it appeared that chemotherapy saved the patient's life. In our experience Shiga organisms are more susceptible to sulphaguanidine than are Flexner organisms.

The average hospital stay of 23·5 days for patients with Shiga dysentery includes the time spent in waiting for the result of examination of the final swab and for discharge from hospital. Even patients with mild Shiga dysentery were not discharged from hospital before the eighteenth day.

Flexner Dysentery.

In only 6% of cases of Flexner dysentery was the disease severe, and the severity was comparable to the moderately severe Shiga cases. We were unable to differentiate between the six antigenic Flexner types, through lack of the necessary monovalent sera, so cannot identify severity with any particular strain. Fever was present in 56% of cases, and in two instances the temperature was 105° F. at the onset.

Two patients suffering from Flexner dysentery at the end of treatment relapsed and presented all the features of acute bacillary dysentery, in spite of the fact that examination of rectal swabs on the thirteenth day, when they were apparently cured, had produced negative results. One man left hospital on the fifteenth day, to be readmitted three days later with positive bacteriological findings from a rectal swab. The other patient, on the day he was due to leave hospital, relapsed with diarrhœa and a temperature of 102° F. He passed eight fluid stools per day for two days, and culture from a rectal swab gave positive

Table VI.
Clinical Response in Bacillary Dysentery.

Type of Dysentery.	Number of Cases.	Average Number of Days Before Treatment.	Average Number of Bowel Actions in Previous 24 Hours.	Average Period Within which Improvement Occurred. (Days.)	Average Period Before Stools were Formed. (Days.)	Average Stay in Hospital. (Days.)
Shiga	56	2·7	17	3·9	8·0	23·5
Flexner	179	2·0	9	1·8	4·4	17·5
Schmitz	23	2·0	8	1·9	3·6	14·0
P274	2	3·5	6	2·0	4·0	14·0
Bacteriologically unproved dysentery	214	3·2	9	1·6	4·0	10·8
Total	474	—	—	—	—	15·0

results. It is possible that in both cases reinfection with a different Flexner strain had occurred.

During the course of this work there were two outbreaks of dysentery in camps near at hand, so that patients were admitted to hospital early in the disease and usually without treatment. Flexner organisms were isolated from 25 of the 30 cases in the first outbreak and from 24 of the 29 cases in the second outbreak.

The average stay in hospital of 17·5 days includes an extra stay for thirteen convalescent carriers and nine patients with psychogenic post-dysenteric diarrhœa. If these 22 cases are excluded, the average stay in hospital is fifteen days. This is still greater than the eleven days quoted by Bulmer and Priest[5] and the ten days (approximately) of Paulley's[4] patients for dysentery treated with sulphaguanidine. In view of the inadvisability of discharging a patient from hospital before the sigmoidoscopic appearances are normal and bacteriological cure is established, it would be difficult in this area to discharge many patients before the fifteenth day, especially since there were sixteen convalescent carriers on the fourteenth day in our series of 179 cases of sulphaguanidine-treated Flexner dysentery.

Schmitz Dysentery.

Cases of Schmitz dysentery were mild in type and spasmodic in occurrence, and no local outbreaks were observed. Response to sulphaguanidine therapy was good, and no convalescent carriers were detected. In more than half the cases the bowel mucosa was normal on the tenth day, while in the remainder at this time persistent hyperæmia was present, and mucus with ulceration was noted in one case.

Bacterium Dysenteriæ P274 Dysentery (Boyd IV).[3]

P274 (Boyd IV) dysentery was uncommon, only 25 cases being encountered in eighteen months and two cases in the last three months. No unusual features were observed. This organism was isolated from a patient with Flexner dysentery who had a recurrence of symptoms on the fourteenth day. This appeared to be a cross-infection from a patient with P274 dysentery who was occupying a bed a little further along the ward.

Bacteriologically Unproved Bacillary Dysentery.

The category "bacteriologically unproven bacillary dysentery" represents cases of acute diarrhœa associated with colicky abdominal pains, in which blood and mucus may or may not have been present in the stools, and in which no pathogenic organisms were isolated on attempted culture. When the incubation of material from rectal swabs on desoxycholate-citrate agar was instituted, the group was reduced in size to 46% (in Table II) from 64% (in Table I). We believe that the earlier the cases are investigated, the greater will be the reduction in size of this unproven group. We have already quoted 83% and 86% positive results in two small local outbreaks of diarrhœa.

From our experience in New Guinea we would agree with Fairley and Boyd,[3] Bulmer and Priest,[5] Perry and Benstead[9] and others that epidemic diarrhœa appears to be almost synonymous with bacillary dysentery. There is ample evidence that blood and mucus may not be visible in stools from patients infected with dysenteric organisms, and it would seem a dangerous concept to perpetuate what soldiers have often been led to believe—that one must wait for the appearance of blood and mucus in the stools before diagnosing bacillary dysentery. In an earlier communication it was shown, in a small series of cases, that 15% of cultures from rectal swabs gave positive results when proctoscopy revealed no mucus; when mucus was present 81% of cultures gave positive results.

Analysing the data given in Table VI, we see that the unproved group of 214 cases closely resembles the 260 proved cases, except that in the former the disease was milder. Sigmoidoscopic findings in the "unproved" group are usually typical of bacillary dysentery, but not always so gross; in 27 cases the mucosa was normal, in 79 it was strawberry red in colour and hyperæmic, in 67 it was hyperæmic and œdematous and mucus was present, and in 12 it was hyperæmic and contact bleeding and ulceration were present.

It has been our experience that "food poisoning" in this area is almost always due to dysenteric organisms. During the course of this survey five men from one unit reported with vomiting and diarrhœa following a meal. Flexner organisms were isolated from the stools of three of them. Cultures obtained in an outbreak of suspected Salmonella food poisoning in a forward area were sent to us, and these also proved to be Flexner organisms. Gastro-enteritis due to Salmonella organisms appears to be rare in New Guinea. Food poisoning of "toxin" type was also uncommon and was clinically distinguishable from bacillary infections by the rapidity of onset with excessive vomiting and overwhelming collapse, revealed by the lowered blood pressure associated with a weak and thready pulse. Patients recovered quickly, but the intravenous administration of saline solution was sometimes necessary.

Complications and Sequelæ of Bacillary Dysentery.

It is often difficult to state whether a supervening infection is part of the disease already present or a new condition. In this series there were no serious complications attributable to the infection. There was one case of iritis on the tenth day and another of conjunctivitis on the fourteenth day. Between the tenth and fourteenth days of illness three patients had a "toxic arthritis" of the hands and two had a similar condition in the knee joint; but these complications were transient, perhaps owing to early treatment in the acute case, and not comparable to the dysenteric arthritis referred to by Bonnin and Kay.[10] One patient had prolapse of the rectum, and two others had gross thrombosis of the pile-bearing area with ulceration.

After the infection had subsided there was no evidence, even in men who had been seriously ill, of permanent damage to the bowel wall with resulting colonic dysfunction. It is reasonable to assume that the bacteriostatic action of sulphaguanidine given early and in adequate amount checked the inflammatory process in the bowel wall at a stage when complete resolution, as far as can be ascertained clinically, could occur.

In thirty cases, however, the patients still complained of frequent loose stools—two, three or four per day—one week after the infection had subsided. The bowel mucosa was still hyperæmic, but there was no ulceration, no contact bleeding or mucopus, and laboratory investigations for bacillary and amœbic infection gave negative results. Hyperæmia of the lower part of the bowel, without additional symptoms or signs, does not imply a pathological condition. There is no question that, after the infection has subsided, the lower part of the bowel does remain "irritable" for some time in a small percentage of cases. Whether this irritability is due to emotional stimuli or to local neuromuscular imbalance, which may be an aftermath of the inflammatory process, is a matter of opinion. It is significant that 17 out of the 30 patients gave histories of emotional upsets, with mild anxiety features and unsatisfactory personal adjustments. These were difficult patients; their hospital stay was much longer than the average, and it is obvious that some of them had unnecessary amounts of sulphaguanidine. Little attention is given to this type of case in the text-books, but the condition is summarized in the technical instruction of the Director of Medical Services, Australian Imperial Force, Middle East. Once recognized, the condition is usually relieved by reassurance and the administration of sodium phenobarbital. An analysis of the "irritable bowel" cases in this series is given in Table VII.

Patients suffering from chronic bacillary dysentery respond to sulphaguanidine if admitted to hospital. Only eighteen patients in 474 gave a history on their admission to hospital of diarrhœa lasting longer than fourteen days. Of these, three were "late excretors"; but the condition of two cleared up within twenty-one days, and in the third case the condition was resistant for three months.

The absence of fatal cases must be attributed to early sulphaguanidine therapy, which reduced toxæmia, prevented dehydration and eliminated complications.

TABLE VII.

Thirty Cases of "Irritable Bowel" amongst 472 Cases of Bacillary Dysentery.

Type of Organism.	Number of Patients in Group.	Post-Dysenteric Diarrhœa. (Number of Patients.)	Average Dosage of Sulphaguanidine. (Grammes.)	Average Stay in Hospital. (Days.)
Shiga	56	6 (11·0%)	203	37·0
Flexner	179	11 (6·1%)	168	28·5
Schmitz	23	2 (8·7%)	185	29·0
Unproven	214	11 (5·1%)	155	24·5
Total	472	30 (6·3%)	171	29·0

Toxic Manifestations of Sulphaguanidine.

The toxic manifestations of sulphaguanidine were few in number, occurring in only twelve out of 474 cases (2·5%). In an area where malaria and dengue fever are prevalent, transient fevers and rashes are usually due to one of these diseases; but in the cases listed in Table VIII we feel confident that there was no unrecognized infection, and that manifestations were actually due to sulphaguanidine.

It seems reasonable to assume that some patients have a temporary or permanent drug hypersensitivity so that large doses are not necessary to produce toxic manifestations. Table VIII shows that in five cases the dosage was very moderate.

TABLE VIII.

Toxic Manifestations of Sulphaguanidine.

Case Number.	Days of Treatment.	Dosage. (Grammes.)	Duration. (Days.)	Nature of Symptoms.
I	5	80	5	Rash, headache and temperature of 102° F.
II	5	85	3	Rash, which reappeared with second course of drug treatment, mild adenopathy and fever.
III	5	85	3	Rash, headache and fever.
IV	13	108	2	Rash, headache and fever.
V	8	110	2	Headache and fever.
VI	5	85	2	Nausea and vomiting.
VII	12	160	2	Indigestion and anorexia.
VIII	5	112	1	Indigestion and anorexia.
IX	5	101	1	Indigestion and anorexia.
X	42	297	3	Angioneurotic œdema, joint swelling, "irritable bowel".
XI	10	140	3	Headaches and dizziness.
XII	11	85	14	Granulocytopenia, anæmia.

In Case II a macular rash, almost morbilliform in type, appeared on the arms, trunk and legs on the fifth day of treatment. Fever and slightly tender glands in the neck, axillæ and groins were also present. The rash faded when administration of the drug was discontinued; but when it was necessary to give sulphaguanidine again, owing to the persistence of positive bacteriological findings, the rash reappeared. Sulphadiazine was substituted without signs of hypersensitivity, and the dysentery condition subsided.

In this case, as in others in which a rise in temperature occurred after the initial fever had subsided, blood films showed no evidence of malarial infection.

It is a moot point whether the nausea and epigastric discomfort of which patients occasionally complain are due to the infection or to the drug. Medical officers who have had bacillary dysentery with drug treatment consider that these symptoms are due to sulphaguanidine.

In Case X the œdema cleared up when chemotherapy was discontinued. This boy, aged twenty years, suffered from Shiga dysentery followed by post-dysenteric diarrhœa of nervous origin, and we now believe that the dosage of sulphaguanidine was certainly excessive.

In Case XII the patient had granulocytopenia, an extremely rare complication of sulphaguanidine therapy. This case will be reported fully at a later date. The condition was Shiga dysentery of long duration, but only small sulphaguanidine dosage was given. After an initial leucocytosis of 25,000 per cubic millimetre, 90% of the cells being neurophile polymorphonuclear leucocytes, the number dropped rapidly to 1,500 per cubic millimetre, only 3% being neutrophile cells. Concurrently a rash, high continued fever and severe anæmia were present. Investigations excluded malaria and scrub typhus. Recovery followed withdrawal of the drug, a slow drip blood transfusion and the administration of "Sodium Pentnucleotide".

Carriers in Bacillary Dysentery.

We had a limited experience with carriers in field surveys on a small scale, and three such investigations will be briefly quoted. The method employed was that adopted by Hardy, Watts and de Capito[17]—namely, cultural examination of rectal swabbings taken blindly through a rubber guard tube from all personnel involved.

The first investigation covered 120 natives in an army catering establishment where there was no history of diarrhœa in the past three months. All the natives were apparently healthy and only one carrier was detected (Flexner organism); the carrier rate was thus less than 1%.

The second investigation covered fifty men on duty in a unit where a moderately severe Flexner dysentery epidemic was in progress and an odd case of Shiga dysentery occurred. Five carriers of Flexner organisms were detected—a carrier rate of 10%. Of these, three appeared to be "convalescent carriers", having been discharged from hospital within the last six weeks, while two were "true carriers" and gave no history of recent diarrhœa. Only one of the carriers, a convalescent, had any frequency of bowel actions; but there were four others with mild symptoms and no pathogens were isolated from them.

The third investigation covered 133 men on duty in a unit affected with epidemic diarrhœa. There had been three cases of Shiga dysentery from this unit in the previous week, and we were searching primarily for carriers of Shiga organisms. Seven carriers were detected (5·2%), of whom two were Shiga carriers. Both of the latter had mild symptoms, one being in his first attack and the other having probably carried the organism since his attack of dysentery three months before. The five Flexner carriers were all symptomless; they comprised two "convalescent carriers", seven and ten weeks after their attack of Flexner dysentery, and three "true carriers", who gave no history of recent diarrhœa.

Since so many Flexner carriers are symptomless, it is apparent that in a search for carriers clinical investigation can be of limited value only; the ambulatory chronic carrier will be detected by clinical means, but many other carriers, perhaps equally important, will be missed. This argument may not apply to Shiga carriers.

Using only one final swab as a test for bacteriological cure, in our series of 260 cases of proved bacillary dysentery, we found that 17, or 6·5%, still harboured organisms on or about the fifteenth day after treatment had commenced. This does not, however, represent the percentage of patients who are clinically cured but still harbour organisms. Of the 179 patients suffering from Flexner dysentery, sixteen were still excreting Flexner organisms on the fourteenth day of treatment. At sigmoidoscopic examination only seven of these were considered normal and could be regarded as clinically cured. In six cases a strawberry-red mucosa was present, and in three persistent ulceration was found. Thus, with regard to Flexner dysentery, by means of our limited technique, only seven of 179 patients (4%) were found to be

TABLE IX.

Convalescent Carriers among 260 Patients with Bacteriologically Proved Bacillary Dysentery.

Dysentery Strain.	Number of Patients.	Organisms Grown from Rectal Swabs.		
		10 to 20 Days.	21 to 30 Days.	After 30 Days.
Shiga	56	1	—	—
Flexner	179	11	2	3
Schmitz	23	—	—	—
P274	2	—	—	—

harbouring organisms when they were clinically cured. Table IX shows these late excretors and the periods for which they remained carriers.

For many reasons it is difficult to compare our figures with those of other workers. The best comparison is with those of Fletcher and MacKinnon (1919), who found 7·59% of carriers amongst 935 patients in a camp for dysentery convalescent patients. Our comparable figure would be 4% among 179 convalescents from Flexner dysentery. Jamieson, Brodie and Stiven[16] report a 30% convalescent carrier rate among 100 sulphaguanidine treated patients, compared to 50% among controls; but many of these carriers were detected only by subculture from an enrichment broth, and it appears that several stool specimens were examined. Swyer,[19] on the other hand, obtained bacteriological clearance in Sonne dysentery after an average of five days' treatment with sulphapyridine.

Treatment of Carriers.—Symptomless carriers, who had had no previous sulphaguanidine medication, responded to a full course of the drug; but carriers detected after sulphaguanidine therapy were more difficult to treat. The general plan was to give an extra course of 80 grammes of the drug, and if this proved ineffective, to give a course of 24 grammes of sulphadiazine. Of fifteen patients who were given a second course of sulphaguanidine, from seven, of whom five were clinically cured before this course, no organisms were recovered thereafter from three swabs. One carrier, who was still harbouring organisms, had to be evacuated to the mainland. The remaining eight patients received a course of sulphadiazine, after which six ceased to harbour organisms. Two patients still continued to harbour organisms. One had spongy, hyperæmic mucosa, but without ulceration, which had been present before. Both patients were given a watery suspension of sulphaguanidine *per rectum*, ten grammes per day for ten days. Before its administration the bowel was washed out with sodium bicarbonate solution. Thereafter one patient felt well and had normal stools and normal mucosa; no organisms were detected on three swabs, so he was discharged. The remaining patient was still found to be harbouring organisms on three consecutive days, so after an interval he was given a course of sulphadiazine which produced clinical and bacteriological cure. We think it worth while to persevere with the treatment of these carriers rather than summarily discharge them back to their units, where, living in isolated communities, they may provide opportunities for fresh infections. We noted that five of the above series of carriers came from a small epidemic of 29 cases; this suggested that the Flexner strain concerned may have been unusually resistant. Summarizing our experience, we would suggest that if patients are not bacteriologically free from dysentery organisms after a full course of sulphaguanidine treatment, they should be given a course of 24 grammes of sulphadiazine over a period of five days as offering the most likely chance of eliminating the pathogen.

Amœbic Dysentery and Amœbiasis.

A history of recurrent diarrhœa with only temporary relief from sulphaguanidine demanded a search for *Entamœba histolytica* in the stools. Fifteen cases of amœbiasis were detected in 503 consecutive cases of diarrhœa. Vegetative forms were found in ten cases and cysts in five cases.

The condition was diagnosed during the first two or three days of hospital stay; the diagnosis was prompted by the clinical features, or the condition was specifically investigated after a full course of sulphaguanidine had been given without relief. In the latter instance it was often necessary to examine several stools, and a saline purge was often helpful. In two cases the diagnosis was made after examination of the first four stools had given negative results. In only two cases was the condition acute, with severe clinical manifestations and gross bowel changes as observed on sigmoidoscopic examination. Both of these patients had ulcers about 0·5 centimetre in diameter, covered by a yellowish membrane, and the response to treatment was dramatic. The ulcers appeared to "melt" away, and in twelve days had disappeared, leaving an apparently healthy mucosa.

There were three cases in which no positive evidence of amœbiasis was obtained, although from the clinical history and examination such a diagnosis seemed probable. Clinical response to emetine therapy was so good that the diagnosis was considered perfectly justifiable.

Treatment of Amœbic Dysentery.

Except as a therapeutic test to confirm the diagnosis of amœbiasis, emetine hydrochloride injections were not given. Such treatment would have been used for amœbic liver abscess, but no such cases occurred in this series. The routine treatment consisted of the administration of emetine bismuth iodide in gelatine capsules. The drug was given at night four hours after a light meal and preceded by one grain of sodium phenobarbital. On the first night one grain, on the second night two grains and on the third night three grains of emetine bismuth iodide were given. Then three grains were given every night for seven nights—a total dosage of 27 grains. Concurrently with the emetine bismuth iodide treatment "Yatren" was given as a retention enema every day for ten days. The lower part of the bowel was washed out with sodium bicarbonate solution and the "Yatren" was then instilled (eight ounces of a 2·5% solution). We are satisfied that "Yatren" enemata hasten the healing process in the bowel; but they tend to keep up the daily stool rate. On completion of the emetine bismuth iodide and "Yatren" treatment a course of "Carbasone" capsules was given, 0·25 gramme per day for ten days. During this phase the stool rate became normal. A few days after completion of the treatment three stools were searched for *Entamœa histolytica*, and if negative results were obtained the patient was discharged from hospital.

Nervous Diarrhœa.

The majority of patients suffering from nervous diarrhœa gave a long history of recurrent diarrhœa, often having had several courses of sulphaguanidine treatment in forward areas. A few with more obvious anxiety states found their way to medical wards instead of dysentery wards and often underwent radiological investigation of the gastro-intestinal tract. The fourteen patients admitted to dysentery wards during the course of this survey were classified as follows: inadequate personality, four; fear state, one; anxiety hysteria, seven; mild anxiety state, one.

In all cases the dominant feature was a history of emotional instability. Stool examinations gave completely negative results, and at sigmoidoscopy the mucosa was either normal or appeared only slightly hyperæmic, merely as a result of the increased frequency of bowel actions.

The essential step in disposal of these patients is reclassification by medical boarding or reallotment of duties within the unit. One case history is illustrative of most of these cases.

A soldier, married, aged thirty-six years, was evacuated from his battalion because of diarrhœa. As a child he had suffered from bed-wetting, biting of the nails and a fear of dark places. At school he had a "nervous breakdown". Before enlistment he was subject to bouts of diarrhœa. After arrival in New Guinea he became nervous and excited during raids and had intermittent diarrhœa. In the battle area from which he was evacuated he had become utterly exhausted, and the diarrhœa recurred. He was trembling and agitated, never having less than three bowel actions in the day. Exercise, and aeroplanes flying low overhead, accentuated his symptoms.

It is obvious that such a man was useless as a fighting soldier.

Conclusions.

An account is given of the immediate treatment with sulphaguanidine of all patients suffering from acute diarrhœa encountered in New Guinea over a period of three months. It is considered that at least 90 grammes of the drug should be administered over a period of seven days. We are satisfied that sulphaguanidine is the drug of choice, no matter what value is placed on other forms of chemo-

therapy and on other forms of treatment. Sulphaguanidine can be given freely to field units living on an ordinary army diet, with good effect and with little risk of toxic complications.

In support of the view that all patients with acute diarrhœa should receive sulphaguanidine treatment, it is pointed out that only 24 of 503 men consecutively admitted to the dysentery wards (4·8%) received such treatment which further investigation showed to be unnecessary; these were men suffering from amœbic dysentery and "nervous diarrhœa". Five of the 503 patients did not receive chemotherapy because their condition was recognized as not due to bacillary dysentery.

There is no place for complacency in ignoring the mild case of diarrhœa characterized by little or no constitutional disturbance and the passage of a few relaxed stools which may not contain blood and mucus. This type of disorder is apt to be regarded lightly by medical personnel, especially in the field. A significant number of such men can be bacteriologically proved to be suffering from bacillary dysentery, and in New Guinea at least, we regard them all as suffering from bacillary dysentery. Explanations involving unaccustomed climate, unusual food (for example, fresh meat) and chlorinated water should be discounted. If these men are neglected the general standard of hygiene is lowered and carriers accumulate in the unit.

It is suggested that cases of acute epidemic diarrhœa should be classified under two headings only—"bacillary dysentery unconfirmed", when the condition is not bacteriologically proven, and "dysentery" (preceded by the name of the pathogen when isolated). The condition commonly spoken of as "simple diarrhœa" comes in the first category, and such terms may well be forgotten.

It is not sufficient to be satisfied that a cure in bacillary dysentery has been achieved when symptoms and signs are absent and the sigmoidoscopic appearances are normal. A rational standard of bacteriological cure is shown by the absence of pathogens on two or three rectal swabs, and the convalescent carriers thus detected should be rigorously treated.

The most important control measures in bacillary dysentery are the isolation of acutely ill patients, effective treatment of carriers and rigid hygiene measures. If hygiene control cannot restrict the spread of an epidemic, owing to difficulties associated with terrain and military necessity, the solution may lie in the adoption of prophylactic treatment with sulphaguanidine.

Summary.

1. Experiences in the chemotherapeutic treatment of bacillary dysentery in New Guinea have been described, and the value of early treatment with sulphaguanidine as the drug of choice is confirmed.
2. Among 2,810 cases of bacillary dysentery encountered in eighteen months there have been no deaths.
3. The average period of stay in hospital in 474 consecutive cases of bacillary dysentery was fifteen days.
4. The value of examining rectal swabs by desoxycholate-citrate agar medium in detecting an increased number of dysenteric organisms, under the conditions in which we worked, is pointed out.
5. The necessity for the detection of convalescent carriers and for their careful treatment is stressed.
6. The setting up of a standard of bacteriological cure in bacillary dysentery by the absence of pathogens from two or three swabs is advocated.
7. Amœbic dysentery had a low incidence (3%) and is briefly discussed.

Acknowledgements.

We wish to thank Brigadier N. H. Fairley and Lieutenant-Colonel S. W. Williams for their encouragement and kindly criticism, Major A. V. Jackson for his assistance in the pathological work, and the medical officers in the dysentery wards (Captain L. Atkins, Captain M. Dunn and Captain R. Constable) for their enthusiastic cooperation. Finally we are indebted to the Director-General of Medical Services, Major-General S. Roy Burston, who has given permission for this paper to be published.

References.

(1) S. W. Williams: Personal communication.
(2) N. H. Fairley and J. S. K. Boyd: "Dysentery in the Middle East with Special Reference to Sulphaguanidine Treatment", *Transactions of the Royal Society of Tropical Medicine and Hygiene*, Volume XXXVI, January 30, 1943, page 253.
(3) S. W. Williams, A. J. Sinclair and A. V. Jackson: "Mite-Borne (Scrub) Typhus in Papua and the Mandated Territory of New Guinea: Report of 626 cases", THE MEDICAL JOURNAL OF AUSTRALIA, Volume II, November 18, 1944, page 525.
(4) J. W. Paulley: "Treatment of Bacillary Dysentery in the Middle East", *The Lancet*, Volume II, November 21, 1942, page 592.
(5) E. Bulmer and W. M. Priest: "Bacillary Dysentery: Chemotherapy in its Treatment: An Experience of 492 Cases in the Middle East", *The Lancet*, Volume II, July 17, 1943, page 69.
(6) A. A. Ferris and C. Fortune: "The Bacteriological Diagnosis of Bacillary Dysentery by Means of Rectal Swabs", THE MEDICAL JOURNAL OF AUSTRALIA, Volume II, October 21, 1944, page 430.
(7) T. L. Roberts and W. B. Daniels: "Succinylsulfathiazole in the Treatment of Bacillary Dysentery", *The Journal of the American Medical Association*, Volume CXXII, July 3, 1943, page 651.
(8) H. M. Perry and H. J. Bensted: "Investigations in Egypt of Some Acute Bacillary Intestinal Infections", *Transactions of the Royal Society of Tropical Medicine and Hygiene*, Volume XXII, April, 1929, page 511.
(9) L. E. Rothstadt, F. Fenner and B. A. Baker: "Bacillary Dysentery Caused by Bacterium Dysenteriæ P274", THE MEDICAL JOURNAL OF AUSTRALIA, Volume I, April 17, 1943, page 341.
(10) N. J. Bonnin and H. B. Kay: "Dysenteric Arthritis: Case Reports and Comments", THE MEDICAL JOURNAL OF AUSTRALIA, Volume II, November 6, 1943, page 380.
(11) W. Fletcher and D. L. Mackinnon: "A Contribution to the Study of Dysentery Carriers", Medical Research Council of the Privy Council Special Report Series Number 29, 1919, page 1.
(12) Technical Instruction Number 3, Director of Medical Services, Australian Imperial Force (Middle East).
(13) P. H. Manson-Bahr: "Dysentery and Diarrhœa in Wartime", *British Medical Journal*, Volume II, September 26, 1942, page 374.
(14) J. C. Scott: "Prophylactic Use of Sulfaguanidine", *The Journal of the American Medical Association*, Volume CXXII, June 26, 1943, page 588.
(15) E. Moschcowitz: "The Hyperkinetic Diseases", *The American Journal of the Medical Sciences*, Volume CCVI, November, 1943, page 576.
(16) W. M. Jamieson, J. Brodie and D. Stiven: "Bacillary Dysentery in Dundee: A Comparative Study of Treatments", *British Medical Journal*, Volume I, March 4, 1944, page 322.
(17) A. B. Hardy, J. Watt and T. De Capito: "Studies of Acute Diarrhœal Diseases: Typing of Shigella Dysenteriæ Flexner", *Public Health Reports*, Volume LVIII, April 30, 1943, page 696.
(18) R. Swyer: "Sonne Dysentery, Sulphapyridine in its Treatment", *The Lancet*, Volume II, July 17, 1943, page 71.

THERAPEUTIC CONVULSIONS BY REPEATED PASSAGE OF ALTERNATING CURRENT.

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WITH A DESCRIPTION OF THE APPARATUS USED.

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THE induction of convulsions by the passage of an alternating current through the brain is now a well-established therapeutic procedure in psychiatry. Although several types of apparatus are in use, the essential features of them all are only two—a device to vary the magnitude of the current and another device to limit the time for which the current passes. There are apparently many ways of controlling these two factors, to judge by the number of appliances that have been described, but from the point of view of clinical efficiency there does not seem to be much difference between them, so that such minor matters as cost and portability are often the determining factors in the choice of a machine.

Recent literature shows that there are differing views on matters of technique. Thus one worker(1) prefers to use high initial doses, another(2) repeats the treatment "immediately" if no convulsive seizure results, while a

third[3] makes a point of repeating the treatment once or twice at intervals of five seconds if a convulsive seizure does not appear to be coming on from the first application. The Reiter apparatus[4] is used somewhat differently from the others, in that the time for which the current is to be applied is not predetermined. A fluctuating unidirectional current is used, and this is allowed to pass to the patient in a series of short bursts until it is seen from the patient's face that the convulsive seizure is about to commence. Wilcox,[5] who uses this apparatus, states that the current is usually applied for about one second in all, but since it is applied discontinuously it seems that several seconds elapse from the time the current is first applied to the time that the application is finally stopped.

In the course of some experimental work this principle of interrupting the stimulus was applied to an apparatus which delivered the ordinary alternating current (50 cycles per second). By means of a special type of switch it was possible to administer the current to the patient for lengths of time varying from 0·06 to 0·15 second and at intervals of from 0·7 to 3·0 seconds. Voltages of 90 to 150 were used, and the electrodes were applied to each temple as in the Bini method.

The original motive of this work was to see if the interrupting of an alternating current stimulus would cause convulsions to ensue with less current. (This is the main advantage that Wilcox claims for the Reiter apparatus.) It soon became evident that this was not so—in fact, the reverse was the case. Thus patient A reacted when 130 volts had been applied for 0·3 second continuously; but when this voltage was applied for 0·08 second every 0·77 second, the total time for which the current had to be passed to produce a convulsive seizure was 0·6 second.

The accompanying table (Table I) shows some of the results obtained with different "doses" and frequencies. After various combinations had been tried, it was found that to put the doses too far apart meant that the current had to be applied for a longer time at each application, otherwise there appeared to be no summation of the stimuli, and to put the doses too close together meant that often the patient had had a fairly large total dose before a reaction occurred. Thus patient D, when given the current for 0·1 second every 0·7 second, had had eight doses without the appearance of signs that a convulsive seizure was commencing. No doubt she would have reacted had one waited, but to do this would have been to introduce the element of uncertainty and to run the risk that one might have to make another attempt later on to produce the convulsive seizure. It was found that a frequency of about once a second and a duration of application of about one-tenth of a second were a useful compromise. At this rate there is enough time to watch the face between each "twitch"; yet the stimuli are sufficiently strong and frequent to summate in a reasonable time. With none of the doses employed was there any evidence that the patient felt any discomfort.

Although by thus interrupting and spacing the passage of the current more is needed to produce the convulsive seizure, so that there is no advantage at all from that aspect, certain other unforeseen advantages have been found, and these are sufficient, in my opinion, to outweigh the disadvantage of using more current. After all, I can find little evidence that the use of more current increases the risk of brain injury, and in clinical practice I have found no sign that this discontinuous method causes any injurious effect. The apparent advantages of this method are that the onset of the convulsive seizure is not so sudden, and that the apparatus is simpler to operate than any I have used or seen described and is much smaller and less costly.

When the current is applied discontinuously, the clinical effect is obviously different. By the ordinary technique the convulsive seizure begins in most cases with a mighty spasm which comes on absolutely suddenly. It is generally believed that it is this initial spasm which is responsible for the occasional fractures that the treatment is known to produce.[6][7] When the current is allowed to reach the patient in applications of one-tenth of a second every second, the patient twitches each time the current passes, and then relaxes, until gradually the muscles (as seen by observation of the face) go into a tonic spasm and the convulsive seizure begins. From then on the effect is the same as that achieved by the ordinary method.

It is my impression that this more gradual onset is kinder to the muscular system, and that muscular pains and fractures should be less frequent sequelæ. As these complications are in any case rare, and as so far only a few hundred convulsive seizures have been produced by the discontinuous method, it is too soon to speak with certainty on this point; but, having watched seizures produced by both methods, most of the staff believe with me that the original method is more severe. Argument from analogy is fallacious, but I am inclined to liken the original method to giving a stone a mighty push and hoping it will roll down the hill, and the second method to prodding a stone steadily until eventually it starts to move of its own accord.

TABLE I.

Patient and Type of Condition.	Number of Treatment.[1]	Volts.	Duration of Each Dose in Seconds.	Frequency of Doses per Second.	Number of Doses.	Total Time for which the Current was Passed in Seconds.
A. Female, aged fifty-five years; involutional melancholia.	1	130	0·30	—	1	0·3
	2	130	0·06	0·77	10	0·6
	3	130	0·10	1·0	6	0·6
	4	130	0·18	1·1	2	0·36
	5	130	0·15	1·5	3	0·45
B. Female, aged sixteen years; schizophrenia	1	150	0·2	—	1	0·2
	2	130	0·06	0·77	8	0·48
	3	130	0·10	1·0	3	0·30
	4	130	0·13	1·1	3	0·39
	5	130	0·15	1·5	3	0·45
C. Female, aged thirty-seven years; acute psychotic depression.	1	100	0·20	—	1	0·2
	2	100	0·06	0·77	10	0·6
	3	100	0·07	0·9	6	0·42
	4	100	0·10	1·0	3	0·3
	5	100	0·15	1·5	2	0·3
D. Female, aged sixty years; agitated melancholia.	1	130	0·2	—	1	0·2
	2	130	0·10	0·70	9	0·90
	3	130	0·06	0·77	18	1·08
	4	130	0·10	1·0	7	0·70
	5	130	0·15	1·5	4	0·60
E. Female, aged fifty years; involutional melancholia.	1	130	0·3	—	1	0·3
	2	150	0·06	0·77	12	0·72
	3	150	0·10	1·0	9	0·90
	4	150	0·11	0·90	8	0·88
	5	150	0·15	1·5	5	0·75

[1] Each of the treatments produced a major seizure.

The second and quite indisputable advantage of the discontinuous method is the simplicity of its clinical use. No preliminary measurements or calculations are required. Many voltage tappings are unnecessary, and one can manage quite well on three or four. My present apparatus has tappings at 80, 100, 120, 140 and 160 volts; but further experience since this transformer was made leads me to think that three tappings at 30 or 40 volt intervals would be sufficient.

One needs to vary the voltage only for the reason that young patients react much more readily than elderly patients, so that if one used only the highest voltage probably many patients would react after only one dose, thus making the response as in the Bini method, and if one used only the lowest tapping one might have to give a very large number of doses to an elderly patient.

To induce a convulsive seizure all one must do is select a voltage, apply the electrodes and hold down the control button until the patient begins to react. It is a little difficult at first to tell with certainty when the convulsions are about to begin, but after a little practice this becomes easy. In any case, since one or two extra doses do no harm and do not appear to produce a more severe seizure, there need be no anxiety about giving too many doses. As a matter of interest I count the number of doses required (this is easily done as one watches the patient's face and sees it twitch with each dose) and record it for future reference.

A typical record is shown in Table II. The patient was a female, aged thirty-one years, suffering from subacute mania.

TABLE II.

Date.	Voltage.	Number of Doses.	Result.
20.10.44	140	4	*Grand mal.*
21.10.44	140	5	*Grand mal.*
25.10.44	140	5	*Grand mal.*
28.10.44	140	5	*Grand mal.*
1.11.44	140	5	*Grand mal.*
4.11.44	140	3	*Grand mal.*
8.11.44	140	3	*Grand mal.*
11.11.44	140	3	*Grand mal.*
15.11.44	140	4	*Grand mal.*

I do not know how many doses it would be safe to give if the convulsions did not appear to be coming on, but so far only two patients out of about 50 have needed more than ten doses at the highest voltage, and they do not appear to have suffered any ill effects. However, as I can see no point in unduly prolonging the onset, I usually increase the voltage if at the last treatment the patient needed more than ten doses, and if with further experience I find many patients who do not react with ten doses at the highest voltage, I intend to provide for a higher voltage. It is to be noted that data obtained from an apparatus which varies the strength of current by using a tapped transformer cannot be compared with those obtained from other machines, unless one knows that the transformer is of the same load rating. This is because the voltage actually received by the patient is always less than that shown when no current is being drawn from the transformer. Thus when I record that a patient needed twelve doses at the highest tapping, this does not mean that he received these impulses at 160 volts, because if a current of 500 milliamperes is drawn from this particular transformer the voltage drops to 140. This situation could be overcome by the use of a larger transformer or other methods of varying the magnitude of the current; but since normally the patient will receive all his treatment from the same apparatus, there is not much to be gained by knowing exactly what current the patient receives, especially if to obtain this knowledge one must use a more complex or cumbersome apparatus.

The third advantage of the discontinuous method is the simplicity, portability and low cost of the apparatus necessary. The motor-driven switch devised by Mr. Forte is efficient but inexpensive, and no other special components are required, so that the whole apparatus can be made for about one-tenth of the cost of machines at present on the market. In addition to its simplicity it is smaller and lighter than other machines, and can be easily carried from patient to patient.

Acknowledgements.

Acknowledgements are due to Dr. H. M. Birch, Superintendent of Mental Institutions, South Australia, for helpful advice and criticism, and to Dr. L. W. Jeffries, Director-General of Medical Services, South Australia, for permission to publish this work.

References.

(1) Ziskind: Quoted by Himwich, *The American Journal of Psychiatry*, Volume C, November, 1943, page 361.
(2) Kalinowsky: Quoted by Himwich, *loco citato.*
(3) Kennedy: Quoted by Himwich, *loco citato.*
(4) E. Friedman and P. H. Wilcox: "Electrostimulated Convulsive Doses in Intact Humans by Means of Unidirectional Currents", *The Journal of Nervous and Mental Disease*, Volume XCVI, July, 1942, page 56.
(5) Wilcox: Quoted by Himwich, *loco citato.*
(6) L. H. Smith, J. Hughes, D. W. Hastings and B. J. Alpers: "Electroshock Treatment in the Psychoses", *The American Journal of Psychiatry*, Volume XCVIII, January, 1942, page 558.
(7) F. Golla, W. Grey Walter and G. W. T. H. Fleming: "Electrically Induced Convulsions", *Proceedings of the Royal Society of Medicine*, Volume XXXIII, 1940, page 261.

DESCRIPTION OF THE APPARATUS USED.

(W. Forte.)

The accompanying diagram (Figure I) shows the essential details of the apparatus. The transformer is double wound, the secondary winding being carefully insulated, and is rated at 0·25 ampere output (continuous). This results in a small-size unit, though the voltage drop on momentary loads of 0·5 ampere is about 15%. Five secondary tappings are brought out and connected to two-pin (flat) sockets appropriately marked, and flush mounted side by side.

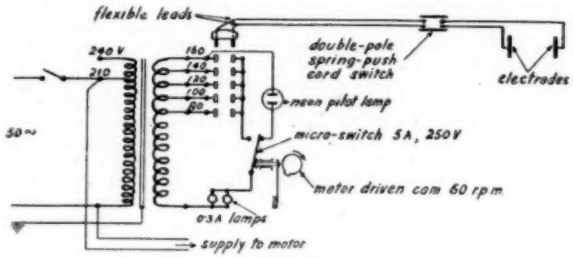

FIGURE I.

The micro-switch is of the extended plunger type with spring over-travel and two-way contacts. The action of the switch is precise and rapid, it requires very little power, the plunger movement is about 0·002 inch and the anticipated life is several million operations. It is actuated by a motor-driven cam running at 60 revolutions per minute and arranged to give the "on" position for 0·1 of a revolution—that is, for 0·1 second every second.

The cam shaft was the turntable spindle of a gramophone motor, governed down to the required speed, and belt-driven on the governor shaft from a universal series motor running at approximately 1,000 revolutions per minute in place of the spring. A better and more compact drive would be from a synchronous or induction motor unit with the output shaft at 60 revolutions per minute or some convenient sub-multiple speed. Various electronic switching devices are possible, but would appear to offer no overall advantage in this case.

Two 0·3 ampere 2·5 volt torch lamps in parallel serve as fuses. A neon pilot lamp, connected as shown, is alight when the micro-switch is in the "off" position, and goes out for the "on" position, thus serving as a convenient indicator. For controlling the circuit to the patient a double-pole spring-push switch (made up of two bell pushes) is connected into the flexible leads at a suitable

position. This arrangement completely isolates the patient from electrical connexion with the apparatus until treatment begins.

In operation, the apparatus is connected to the supply, a secondary voltage tapping is selected, and the primary switch is closed. The motor then clicks the micro-switch off and on, as indicated both by the sound and by the neon lamp, and the desired number of doses, each consisting of about five cycles out of every 50, is administered by holding down the control switch accordingly.

INTRAMUSCULAR ADMINISTRATION OF PENICILLIN: A METHOD THAT ENTAILS ONLY ONE NEEDLE INSERTION DAILY.

By R. S. LAHZ, M.B., Ch.M. (Sydney), F.R.C.S. (Edinburgh),

Honorary Assistant Orthopædic Surgeon, Mater Misericordiæ Public Hospitals, Brisbane.

IN the administration of penicillin by the intramuscular route, two of the disadvantages in the case of children are the frequency and number of injections necessary. In the case of some adults also this is true. Sir Howard Florey in his recent lecture in Brisbane intimated that there was some doubt of the efficacy of administrating penicillin by the continuous intramuscular drip method, at least with any apparatus in use at present. At the Mater Misericordiæ Public Hospitals, therefore, a simple technique has been evolved for intramuscular injection that obviates frequent reinsertions of the needle. The method has now been used for over six months, and no untoward sequelæ have followed its use.

The thigh is used as locus of injection—the antero-lateral surface in the lower half, the lateral surface on the upper half. The area selected is thoroughly prepared surgically. A sterile dressing pad, six inches by three and a half inches in area, is laid over the point of injection, the latter being at the centre of the pad (Figure I). The pad is

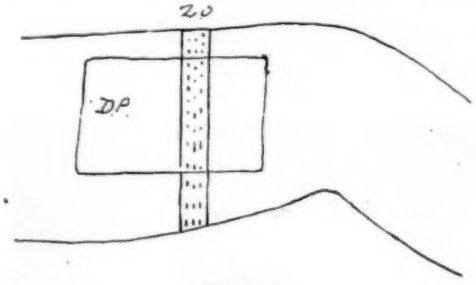

FIGURE I.
Z.O. = adhesive strip, D.P. = dressing pad.

then fixed to the thigh by a strip of adhesive plaster long enough for the operator to be sure that the fixation is firm. The pad is then doubled back over itself (Figure II), and thus covers the strapping on the pad. A sterile needle, whose size varies with the size of the thigh and the amount of fatty covering (in the average case three inches long and of bore 20), grasped by the hub only, is inserted obliquely in the muscles to within five-eighths of an inch of the hub, which rests against the sterile pad. The penicillin is then slowly injected. On completion of the injection, before the syringe is detached, the needle is withdrawn five-eighths of an inch. The syringe is then detached. No penicillin will run out. The needle and pad are then covered with a large pad wrung lightly out of some antiseptic solution. A crêpe bandage is finally lightly applied.

When the next injection is to be given the covering pad is removed. The needle is reinserted five-eighths of an inch and the injection given. A fresh antiseptic pad covers the needle, after which it is again withdrawn five-eighths of an inch.

The fixed pad and needle are changed every twenty-four to thirty-six hours, when a new site is chosen.

We gave much thought to the antiseptic solution used in the covering pad, and have found satisfactory "Monacrin" (1:1,000) or carbolic acid (1:21). Neither of these solutions causes irritation, even when used for ten days. In regard to carbolic acid solution, as MacEwen so stressed, a strength of 1:20 is apt to cause irritation, but not a strength of 1:21, for the latter dilution ensures full solution of the acid.

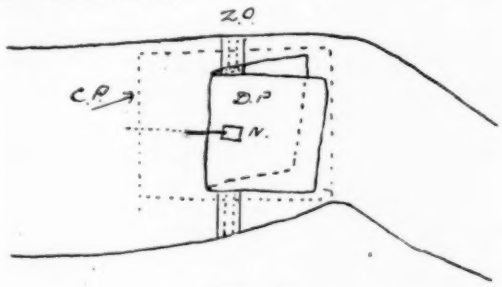

FIGURE II.
Z.O. = adhesive strip, D.P. = dressing pad, C.P. = covering pad, N. = needle.

The operator should exercise scrupulous aseptic technique. Owing to the low temperature of the drug, the injection should be slow.

The advent of penicillin therapy has meant that our nurses must now be skilled in the technique of intramuscular injection. For the amateur, the thigh in the sites indicated is by far the safest area. The medical officer should, I think, initiate the course by giving the first injection. The first change of site should also be superintended by him, while the nurse performs it.

With the method thus outlined no local inflammatory complications have been experienced, except in one case, in which the drug was injected subcutaneously by error. The method has been especially pleasing in the case of children, who have had much less fear of the approach of the trolly. They, and I think all, appreciate the insertion of only one needle per day.

Reports of Cases.

A CASE OF REGIONAL COLITIS.

By RICHARD FLYNN,
Sydney.

CROHN'S DISEASE has been defined as a disease of the terminal portion of the ileum affecting young adults with no real racial predilection, and characterized by a subacute or chronic necrotizing and cicatricizing inflammation, by ulceration of the mucosa and by excessive connective-tissue formation through the wall leading to stenosis and fistula formation. Crohn originally described four main clinical pictures: (i) that of an acute intraabdominal disease similar to acute appendicitis; (ii) that of ulcerative colitis; (iii) that of chronic intestinal obstruction; (iv) that of a persistent fistula in the right iliac fossa.

The symptomatology is also varied, depending on the stage reached in the pathological process; abdominal pain, diarrhœa, fever, anæmia, fistula, loss of weight, nausea, vomiting, and on rare occasions hæmorrhage occur.

The ætiology of the disease is unknown, though it is obviously an inflammatory lesion, and it may occur at any age. Though originally described as occurring only in the terminal portion of the ileum, it is now known that it may be found anywhere from the jejunum to the sigmoid colon and that sometimes multiple areas are involved. The appendix may be suspected as a focus in right-sided lesions, but it would be difficult to consider it in causal relationship to a lesion of the sigmoid colon.

Usually the most important clinical finding is a mass in the right iliac fossa, to which may be added the signs of a fistula and the scar of a previous appendicectomy. The diagnosis can be confirmed radiologically usually by the

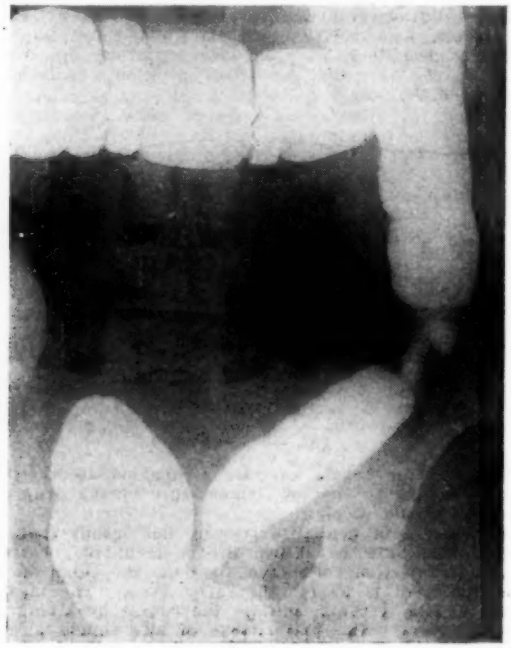

FIGURE I.

characteristic filling defect and narrowing of the terminal portion of the ileum—the so-called string sign—often with great dilatation of the small intestine above the lesion.

Crohn is of the opinion that short-circuiting operations offer success in not more than 50% of cases, and that the percentage of success is nearer 25 than 50. He therefore advises excision. Few cases have been reported in which

FIGURE III.

the lesion occurred in the sigmoid colon. Brown and Donald, reporting 178 cases, noted none in the region of the descending and sigmoid colon.

Clinical Record.

A.E.B., a female patient, non-Jewish, aged forty-five years, sought medical advice on April 23, 1943, because of hæmorrhage *per anum* associated with abdominal pain and diarrhœa over a period of about eighteen months. The pains were colicky in nature and were followed about one hour after their onset by watery diarrhœa; occasionally she vomited.

FIGURE II.

The attacks lasted for about one to three days and occurred about every eight weeks. About twelve months previous to consultation she had noticed blood in her stools, but she thought it was due to hæmorrhoids, which she had had since

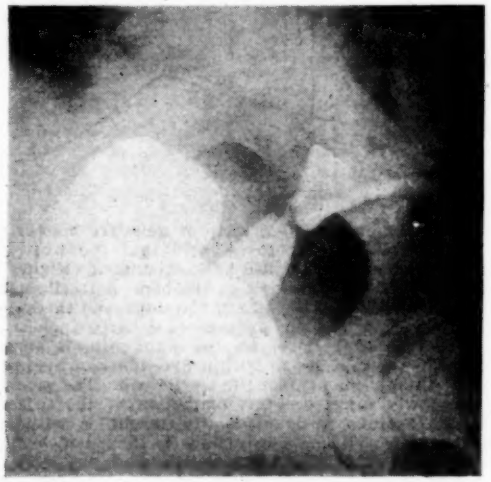

FIGURE IV.

the birth of her last child, now aged thirteen years. She had lost about two stone in weight since the onset of her trouble. No other symptoms referable to other systems disturbed her. A blood count gave the following information: the erythrocytes numbered 4,140,000 per cubic millimetre, the hæmo-

globin value was 16%, and the colour index was 9. Radiographic examination was carried out after a barium enema on December 10 and a constricting deformity of the middle third of the descending colon was found; this was thought to be due to a ring carcinoma (Figure I).

Accordingly the patient was prepared for an exploratory laparotomy with the provisional diagnosis of carcinoma of the descending colon. Under anæsthesia with ether given by the intratracheal method a left paramedian incision was made and a lesion in the descending colon was exposed; but its appearance did not suggest carcinoma but rather Crohn's disease. I resected the involved area, performing a Rankin obstructive resection by means of a Rankin clamp. The patient's convalescence was uninterrupted. The report of the pathologist, Dr. Day, was as follows:

> The specimen consists of a piece of colon sixteen centimetres in length. In the central part there is a length of seven centimetres in which the wall feels thickened and the lumen is narrow [Figure II].
>
> Microscopic. In the narrow part of the gut there is a submucous fibrosis with small round cell infiltration. The muscularis appears hypertrophied. Groups of large histiocytes and giant cells are scattered throughout the submucosa. The appearance is not that of tubercle but of chronic non-specific inflammation. One part of the mucosa is ulcerated.

At operation I had noticed another suspicious area in the more distal portion of the sigmoid, and believing that the lesion was regional enteritis I did not resect it, as to do so would have materially increased the operative risk. However, when the time came to consider restoration of the continuity of the bowel, a radiograph was made of the rectum and sigmoid colon after a barium enema. This showed a smooth constriction in the sigmoid colon without dilatation above or below (Figure III).

Radiographic examination after a barium enema was repeated on March 30, 1944; the radiologist reported the presence of a constriction in the sigmoid colon with complete obstruction at that level. On October 10 the radiologist was asked to inject both ends of the disfunctioned bowel. He reported that the enema flowed backwards from the anus to the proximal part of the sigmoid colon, where it was obstructed; barium introduced through the distal opening of the colostomy flowed to the same point, and a filling defect was revealed with almost complete obstruction (Figure IV).

Figure IV shows an area of bowel involved in a stricture; it is similar in appearance to the so-called string sign met with in cases of regional enteritis involving the ileum.

Comment.

The case reported here is interesting because of the site of occurrence and because of the dual lesion.

CEREBRAL ABSCESS: AN ACCOUNT OF A SUCCESSFUL CASE.

By ALAN GRANT,
Major, Australian Army Medical Corps, Australian Imperial Force.

(From an Australian Women's Hospital.)

Clinical Record.

A MEMBER of the women's services, aged twenty-seven years, was admitted to this army women's hospital on September 19, 1944, suffering from a furuncle over the right malar bone, of three days' duration. It was complicated by an areola of cellulitis which extended onto the right upper eyelid. Her temperature was 100° F. at that time and her pulse rate 100 per minute.

No other abnormalities were found in any system. A culture revealed the presence of hæmolytic *Staphylococcus aureus* in the furuncle. A plain X-ray film of the skull was prepared; it revealed no abnormality in the underlying zygomatic bone or the cranial vault.

A course of sulphadiazine treatment was commenced, two tablets being given every four hours. However, two days after the patient's admission to hospital, the cellulitic area was extending. In view of the laboratory findings indicating the presence of a staphylococcus, the patient was given penicillin, 15,000 units being administered every three hours, the dose to be repeated seven times a day, and administration of the sulphonamide preparation was discontinued. At this stage a blood count was performed, and gave the following information: the leucocytes numbered 14,500 per cubic millimetre; 75% were neutrophile cells, 21% were lymphocytes and 4% were mononuclear cells. A "shift to the left" was observed in the neutrophile cells.

After the patient had been given 200,000 units of penicillin her condition was so much improved that the injections were suspended. A penicillin sensitivity test showed that the organisms were amenable to penicillin, a laboratory finding that was borne out clinically. Nine days after her admission to hospital the patient was clinically cured and was sent to a convalescent home for a week, after which she was examined and found to have no trace of the infection. She was therefore discharged from hospital.

About two weeks later, on October 21, the patient was readmitted to hospital. She had been well for a week after her discharge, and since then had suffered from headaches of increasing severity accompanied latterly by occasional and erratic vomiting and drowsiness which was becoming worse. When she was examined her temperature was 97° F., her pulse rate was only 44 per minute and her respirations were normal. She was drowsy, but when stimulated she would answer questions. A careful investigation of her nervous system revealed no abnormality. Examination of the fundus revealed neither papilœdema nor choked veins. The examination of all other systems gave normal results. The only positive finding was a tender area of œdema, about 1·5 inches in diameter, in the right fronto-parietal region.

Lumbar puncture was performed with the following findings: the cerebro-spinal fluid was under a pressure of 90 millimetres; the fluid was crystal clear on macroscopic examination, and microscopic examination revealed no abnormal cytological findings; the protein content was 40 milligrammes *per centum*. An X-ray examination of the skull revealed an area of osteomyelitis in the right fronto-parietal region directly underlying the red and swollen area of skin. This area was aspirated subcutaneously and a small amount of pus was obtained. A provisional diagnosis of osteomyelitis of the skull, possibly with an extradural abscess, was made.

Operation was performed the next day. An incision was made down to the periosteum and small quantities of pus were seen oozing through the skull. A small opening was made through the bone and only a small amount of pus was found outside the *dura mater*; there were many small holes in that membrane through which pus was leaking. The dura was opened and again but a small amount of pus was seen. The brain bulged into the opening. A seeker was inserted into the brain substance, and at a depth of three-quarters of an inch from the surface a large brain abscess was found. Into this a rubber tube of small bore was placed, the diameter being about that of the tubing formerly used in the Carrel-Dakin apparatus. Fifty thousand units of penicillin were given just prior to operation and another 50,000 units were administered on the completion of the procedure. Thereafter 15,000 units were injected every three hours. That afternoon the patient was mentally alert and much brighter. The pulse rate increased to 80 per minute.

The next day unfortunately told a different tale. The pulse rate was still about 80 per minute, but the patient had become drowsy again and incontinence of urine developed. This was treated by means of a suitable bladder pump of intermittent type. Penicillin injections were continued into the *vastus lateralis*, but in addition five cubic centimetres of solution were injected down the drainage tube, each cubic centimetre containing 500 units of penicillin dissolved in normal saline solution. This procedure was repeated once a day, and was done with care so that pus was displaced at each injection. For the next five days the patient maintained a similar clinical condition. On the fifth day after operation neck rigidity developed for the first time. Lumbar puncture was performed with the following findings: the cerebro-spinal fluid was under a pressure of 50 millimetres and was clear on macroscopic examination; microscopic examination showed it to contain 40 polymorphonuclear leucocytes per high-power field; the protein content was 56 milligrammes *per centum*. A diagnosis of early staphylococcal meningitis was made.

The administration of penicillin was continued by intramuscular injection, 15,000 units being given every three hours seven times a day. In addition ten cubic centimetres of solution were given once a day intrathecally (500 units of penicillin per cubic centimetre of normal saline solution). Sulphadiazine was also administered, two grammes being given every four hours. A record of the intake and output of fluid was kept, and she was given an alkaline mixture of sufficient strength to keep the urine alkaline. From the time of the establishment of this *régime* the patient's condition improved daily over the next week, so that by the end of this time she was mentally normal and had regained

control over her bladder. During the latter days of her rapid improvement the drainage tube was shortened and then removed. Altogether she received seven intrathecal injections of penicillin, and 1,500,000 units intramuscularly, and of the sulphonamide a total dose of 39 grammes.

Discussion.

The first interesting feature about the case was the absence of localizing signs, other than the radiological ones.

The question whether drainage should be instituted arose. The methods of drainage available are continuous drainage by a rubber tube, or intermittent aspiration. Enucleation of the abscess and cavity was discussed and discarded. I am not capable of discussing the advantages and disadvantages of each method, but it is of interest that in this successful case drainage was employed.

Penicillin was given both intramuscularly and intrathecally during the period of improvement. The local administration did not seem to be of any benefit at all. This particular batch of penicillin did not cause pleocytosis in the cerebro-spinal fluid. Some clinicians are of the opinion that penicillin solution should be filtered before being given into the theca, but no facilities for filtering were available. Sulphonamides were given simultaneously, and it is difficult to assess how far they may have been helpful. It is stated that they may act synergistically with the penicillin. This point requires much more clinical trial.

Many indications for giving penicillin are now known; but there is still no unanimity of opinion about when to stop giving this drug. During her first period in hospital this patient received only 200,000 units of this preparation and yet appeared to be quite cured. Subsequent events showed that the dose was inadequate, as another lesion due to the same type of organism developed within two weeks of the first course. When Sir Howard Florey visited this hospital recently he was of the opinion that penicillin is usually given for too short a period in many infections. The same problem is encountered in the treatment of gonococcal infections in women. In most cases examination of slides gives negative results immediately after the usual course of 100,000 units, but in a small proportion positive findings are again obtained a week after treatment has been stopped. It would appear from our experience at this hospital that the administration of penicillin should be continued for longer than has previously been thought necessary after all clinical signs of the lesion under treatment have subsided.

Acknowledgements.

The successful result achieved in this case was an example of hospital team work, and thanks are due to Lieutenant-Colonel F. V. Twohig, Major Helen Taylor and Captain Joan Crosier for their collaboration. The pathological investigations were carried out by Lieutenant Lorna Limbrick.

We are indebted to the Director-General of Medical Services, Major-General S. R. Burston, for permission to publish this case record.

Reviews.

PROGRESS IN RADIOLOGY.

"The 1944 Year Book of Radiology" has been received.[1] It consists of a series of reviews of articles which have appeared in the various radiological journals of the world, and is edited by Charles A. Waters, Whitmer B. Firor and Ira I. Kaplan. The book is divided into radiodiagnostic and radiotherapeutic sections. It is not possible to deal with all the subjects touched upon, but many of the reviews are of outstanding interest. References are given to the source of each review. Several articles deal with stress and fatigue fractures and point out how much more frequently these occur than is usually thought. Many of these fractures are missed at the time and are recognized only during or after repair. One author (M. G. Henry) refers to the frequency with which fractures of the carpal scaphoid are missed and recommends radiography in extreme ulnar deviation in all cases. He also advises immediate excision in all fractures of the inner third of the bone. This is rather drastic, but in his hands has given good results. Air injection of the knee joint is recommended for the demonstration of meniscus injuries (Cullen and Chance). One writer (Groth) considers that single lesions of the *osteitis deformans* type are a distinct entity and do not necessarily belong to a general Paget's disease. Several authors give their opinions on the use of "Priodax" in gall-bladder work. "Priodax" is an iodine preparation without the phenolphthalein content and causes no gastro-intestinal symptoms. It has been widely used in Australia in the past year and is certainly superior to the older preparations in this respect.

Many interesting gastro-intestinal conditions deserve mention, and it is is not possible to refer to these in detail. One of particular interest shows impacted coils of ascaris in the duodenal bulb. Perirenal insufflation is recommended by several South American authors for demonstrating lesions of the suprarenal gland. Attention is drawn to the significance of gas in the fœtus as a sign of fœtal death and several cases are quoted and illustrated (Boyd Roberts).

The section of radiotherapeutics is very complete. The editors refer to the loss of continental cancer research owing to the fact that persons suffering from cancer in Nazi-ruled countries were put to death as cancer was looked upon as too hindering a disease to bother with in wartime. The Soviet Union has been particularly active in research work on cancer. The English tendency to carry on radiodiagnosis and radiotherapy in different departments is now generally approved. Radiation sickness still causes much trouble and no universal cure has been discovered. The editor stresses the importance of skilled workers only being allowed to use radiation as a therapeutic agent. Dosages and results are generally given in the individual reviews.

Altogether this work is well up to the standard of its predecessors and should find a place in the reference library of every radiologist.

[1] "The 1944 Year Book of Radiology"; Section on Diagnosis edited by Charles A. Waters, M.D.; associate editor, Whitmer B. Firor, M.D.; Section on Therapeutics edited by Ira I. Kaplan, B.Sc., M.D.; 1944. Chicago: The Year Book Publishers, Incorporated. 9" × 6", pp. 448, with many illustrations. Price: 37s. 6d.

A YEAR BOOK ON DISEASES OF THE EYE, EAR, NOSE AND THROAT.

"The 1944 Year Book of the Eye, Ear, Nose and Throat" will be welcomed by practitioners who are concerned with the diseases of these organs.[1] They will be able to refresh their memories on subjects discussed in special journals during the preceding twelve months. Practitioners of other specialities can also, if they wish, obtain a useful survey of special aspects of any of these subjects by consulting sections of their choice. Naturally most of the material in the volume has been culled from special journals, but others covering wider spheres have been used.

The part of the volume devoted to the eye occupies nearly three-fifths of its extent. The editor is Dr. Louis Bothman, who opens the volume with a special article on industrial ophthalmology. The succeeding sections are devoted to the several regions of the eye. It is unfortunate that the section on the lens and cataract contains no reference to the extension of the work of Gregg (published in 1941) by the Adelaide workers, headed by C. Swan, on congenital cataract following rubella in the mother (The Medical Journal of Australia, Volume II, 1943, page 201, and Volume I, 1944, page 409). This work is of the greatest importance and should receive the attention of ophthalmologists everywhere. The section on injuries of the eye is important and should be read in conjunction with Bothman's special article. Two subjects dealt with at some length are "Eye Manifestations of Head Injuries" and "Ocular Malingering".

The parts on the ear, nose and throat have been edited by Samuel J. Crowe, who has had the assistance of E. W. Hagens. Under the heading of "The Ear" there appear three sections, devoted to general considerations, industrial and war trauma to the ear, and Ménière's syndrome.

Under the heading of "The Nose and Throat" there are five sections, dealing in turn with nasal and sinus conditions, pharynx and naso-pharynx, the larynx, bronchi and œsophagus, and chemotherapy. There is a good deal here to interest those who specialize in endoscopy. In the section on chemotherapy both sulphonamides and penicillin are mentioned. This year book is a useful volume. It must not be imagined that all the contributions that have been abstracted deal with new and epoch-making work. They do not; but they are full of interest and give a very good idea of contributions to the literature of these specialities during the year under review.

[1] "The 1944 Book of the Eye, Ear, Nose and Throat"; the Eye by Louis Bothman, M.D.; the Ear, Nose and Throat by Samuel J. Crowe, M.D., with the collaboration of Elmer W. Hagens, M.D.; 1944. Chicago: The Year Book Publishers, Incorporated. 7" × 4½", pp. 544, with 68 illustrations. Price: $3.00. Australian price: 23s. 6d.

The Medical Journal of Australia

SATURDAY, APRIL 7, 1945.

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MEDICAL PRACTICE IN NEW ZEALAND.

In many of the discussions on the future of medical practice that have taken place during recent months among members of the several Branches of the British Medical Association in Australia, prominence has been given to what is known as the fee-for-service system of controlled medical practice. Although the Federal Council has expressed the views of the Branches that the needs of the future can be met by the present form of medical practice with certain alterations and additions, it has become clear that, should a system of medical practice controlled by a statutory authority be forced upon the profession, there are many who would prefer a fee-for-service system to any other form of service. In these circumstances it is important that members of the Branches should have some knowledge of the way in which a fee-for-service system operates. The acquisition of this knowledge is possible because of a visit recently paid by Dr. J. G. Hunter, General Secretary of the Federal Council, to New Zealand, where a fee-for-service system has been in operation for some time. Dr. Hunter was accompanied to New Zealand by Dr. C. H. Dickson, Medical Secretary of the Victorian Branch. Dr. Hunter prepared a lengthy report on what he saw and learned in New Zealand, and this report was considered at the meeting of the Federal Council held in Melbourne on March 12, 1945. Dr. Dickson prepared a report for his Branch council.

The *Social Security Act*, 1938-1944, of New Zealand makes provision for "medical, hospital and other related benefits". These are commonly known as "medical benefits" and comprise the following: (*a*) medical benefits, (*b*) maternity benefits, (*c*) pharmaceutical benefits, (*d*) hospital benefits, (*e*) "such supplementary benefits as are deemed necessary to ensure the effective operation of the above benefits (e.g., specialist and consultant services, dental services, home nursing services, and domestic assistance) or otherwise to maintain and promote public health". The benefits are available to all persons ordinarily resident in New Zealand without regard to economic status, race or nationality. The benefits are administered by the Minister for Health, and there are three types of organization. The first is a capitation scheme; the second is a general medical service conducted on a fee-for-service basis; the third comprises special arrangements, concerned with services in special areas and arrangements with friendly societies.

The provisions originally made for a capitation scheme of medical practice were repealed, and in March, 1941, arrangements came into operation under which practitioners may enter into agreements with individual patients in a prescribed form and manner for the provision of medical benefits. The service given is a general practitioner service; no limit is placed on the number of persons whom a practitioner may have on his list, and the fee prescribed at present is fifteen shillings *per annum*. This form of service is not popular with New Zealand practitioners. Forty practitioners are at present engaged in it, and they have 84,407 patients on their lists, an average of 2,110 persons on each list. A few practitioners have large lists, and one, the only practitioner in his district, is stated to have on his list 10,000 persons, mostly Maoris.

The fee-for-service scheme was brought into operation in November, 1941, because so few practitioners had accepted the capitation scheme. The range of service given is referred to as "general medical service". This includes all services of medical practitioners except: (*a*) Medical services calling for skill and experience not reasonably to be expected of general practitioners. (*b*) The administration of anæsthetics when they are given in conjunction with another practitioner or a registered dentist. (*c*) Medical services afforded in relation to maternity benefits. (*d*) Medical services for which no fee would be payable if the act had not been passed. (*e*) Medical services provided by a practitioner under agreement with a friendly society. (*f*) Services excluded by regulation. The following services are excluded by regulation, but may in special circumstances be brought within the service with the approval of the Minister: (*a*) Medical services involved in any examination in which the sole or primary purpose is the obtaining of a medical certificate concerning the health of the person examined. (There are one or two exceptions to this statement.) (*b*) The treatment of venereal disease. (*c*) The extraction of teeth. (*d*) Medical services for injuries in respect of which compensation or damages are payable on account of medical or surgical attendance. (*e*) Medical services for which fees are payable under the Social Security (X-Ray Diagnostic Services) Regulations, 1941. There are three systems under which the fee-for-service scheme operates. The first of these, known as the refund system, is favoured by the New Zealand Branch of the British Medical Association. According to this system the doctor charges his ordinary fee to the patient, and the patient, on production of the doctor's receipt, is reimbursed from the Social Security Fund at the following rates: (*a*) seven shillings and sixpence for each surgery consultation or visit to the patient's residence during any week day; (*b*) twelve shillings and sixpence for attendance urgently requested and given at any time on Sunday or between the hours of nine o'clock p.m. and seven o'clock a.m. Mileage fees of one shilling and threepence outwards and inwards are paid for distances travelled up to twenty

miles beyond the borough where the doctor resides. Under the second system, the fee-for-service system proper, the doctor accepts payment directly from the fund; his claims are paid on production of proof of attendance by the patient. The third system, the "token" system, is a combination of the two foregoing, the doctor looking to the fund for payment of part of his account and to the patient for the remainder. This does not meet with the approval of the New Zealand Branch and is regarded as illegal.

It is important that readers shall understand the significance of these systems, and therefore Dr. Hunter's summary of their advantages and disadvantages may be given. The advantages claimed by the Council of the New Zealand Branch for the refund system are the following:

1. The method causes the least interference with normal conduct of practice. There is no interference with freedom of choice between doctor and patient.
2. The relationship of doctor and patient is not intruded upon by any interested third party.
3. The doctor can give his patient the attention and service he requires and graduate his charges thereto.
4. The patient retains some responsibility for his own treatment, while obtaining return for his taxation without temptation to overdo it.
5. The fund is protected, for there is no inducement for either doctor or patient to abuse it.
6. It involves the minimum amount of government control.
7. It prevents undue and often frivolous calls on the pharmaceutical funds.
8. It is an accepted principle in insurance of any kind, that there is some responsibility left with the insured. In the *Social Security Act* itself there is a means test in the application of sickness and other benefits which precludes a person receiving relief.

Dr. Hunter goes on to state that the only disadvantage from the doctor's point of view is that bad debts still continue. It is important to note that the doctor is precluded from suing for any fee in excess of seven shillings and sixpence. From the patient's point of view the chief disadvantage is that he must pay the doctor's account before he can claim a refund from the Social Security Fund, and the refund may be less than the doctor's account. The patient must make the claim directly to the Department of Health and must complete the required forms in a proper manner. The advantages claimed for the fee-for-service system by a "considerable number of the profession" are enumerated by Dr. Hunter as follows:

1. It introduces no financial bar between doctor and patient, and so the patient is not precluded by any financial consideration from seeking medical advice.
2. It causes very little interference with the normal conduct of practice; and maintains the freedom of choice between doctor and patient.
3. It is fair remuneration for services rendered, having regard to the fact that there are no bad debts.
4. The doctor claims direct from the fund and the patient is thus freed from any difficulty in this regard.

The disadvantages of the fee-for-service system are stated by Dr. Hunter to be the following:

1. It may be abused by both patient and doctor. That there is some abuse at the present time there is no doubt, but this abuse is certain to be very much greater when conditions return to normal—both by the patient because of the greater number of practitioners who will be available, and by the doctor because of keener competition due to the return of service medical officers to civil practice and also to the fact that the number of medical graduates qualifying from Otago University exceeds the future requirements of New Zealand.
2. It tends to inferior work because of the fact that it emphasizes number of attendances rather than quality of service.
3. The Government, because of financial stringency or other reasons, may vary the rate of payment, especially when the whole profession is working under the scheme.
4. The amount of clerical work involved.
5. From the strictly administrative point of view there are no limits for budgetary arrangements.

There is a sharp difference of opinion among medical practitioners in New Zealand as to which of the two systems, the refund and the fee-for-service system, they prefer; opinion is almost evenly divided.

For the sake of completeness reference must be made to the third type of organization for the administration of medical benefits, that included under the heading "special arrangements". In certain special areas doctors are employed on a salary basis. Eighteen practitioners come under this arrangement and their salaries vary from £900 to £1,200 *per annum*. In passing it may be remarked that the Minister has power to declare any area a "special area"; in other words he can introduce a salaried service into any area. The second of the special arrangements has to do with friendly society lodge practice. Lodges have been encouraged to continue in operation, and where the range of service given by the lodge is substantially that available under the State scheme, reimbursement of the cost within certain limits is made from the Social Security Fund to the society.

So far no reference has been made to specialist services. Three branches may be mentioned—maternity services, X-ray services, and services rendered by specialists in other branches of medicine. It must suffice to state that the arrangements in connexion with the first two services are working satisfactorily, the practitioners concerned being content with the conditions of work and the remuneration received. Other specialists are not so happily placed, and patients cannot be expected to enthuse over the conditions. Any specialist receives a refund of seven shillings and sixpence for each occasion on which a service has been provided. Dr. Hunter states that from the point of view of patient and doctor the only satisfactory method of meeting the cost of specialist care is to allow the patient a fixed proportion of the specialist's fee.

Finally, New Zealand's scheme of "free medicine" and its striking results must be mentioned. The general arrangement is for the supply on the prescription of any registered practitioner of pharmaceutical requirements by proprietors of licensed pharmacies who have entered into contracts for that purpose with the Minister for Health. Prescribing is not limited to a formulary; and with certain exceptions a practitioner may order, without cost to his patient, any drugs, medicines or medicinal preparations contained in the British Pharmacopœia, the British Pharmacopœial Codex and the New Zealand Formulary. The result of these provisions has been an enormous increase in the consumption of drugs in New Zealand. The increase is estimated by pharmacists to be at least 300%. The Director-General of Health has stated that for every seven shillings and sixpence paid out for medical benefits, six shillings are paid out for pharmaceutical benefits, and that whereas originally the average cost per prescription was two shillings and tenpence, it is now four shillings. Dr. Hunter remarks in his comments on this state of affairs that while medical practitioners and pharmacists are not entirely blameless, it would appear that the chief reason for the increase is that benefits are available without direct cost to the individual. It would indeed appear that practitioners yield with unpardonable ease to the importunities of patients—Dr. Hunter quotes the following

words, but does not state their origin: "To give or repeat a prescription is the easiest way of getting rid of a patient." One result of the enormous increase in the dispensing of drugs, a result not without its amusing side, has been the publication of advertisements by the Government that, "You can't get health out of a bottle", and laying stress on the basis of healthful living—adequate diet, personal hygiene, physical activity and mental health.

Anyone who would try in present circumstances to arrive at a balanced judgement on the virtues or deficiencies of the fee-for-service system of medical practice at present carried on in New Zealand must remember several facts. The first is that the "medical, hospital and other related benefits" are only portion of the benefits obtainable under the *Social Security Act*. The financial benefits consist, in Dr. Dickson's words, "of universal superannuation, and age, invalids', widows', orphans', family, miners', sickness, unemployment, Maori war, and emergency benefits". All incomes are subject initially to a Social Security tax of one shilling in the pound, *plus* a National Security tax of one shilling and sixpence in the pound in addition to income tax. Both visitors to the Dominion gathered the impression that in spite of this heavy taxation to meet the demands of social security, the people would not be willing to abandon the measure. The second fact to be borne in mind is that conditions of practice in New Zealand, like those of Australia, are at present abnormal. Approximately 25% of the practising doctors are absent on active service and those remaining at home are hard put to it to give adequate medical service to the people. One of the results is that doctors' incomes are higher than usual. No doubt there are in New Zealand, as there are unfortunately in every community, practitioners who will exploit the *Social Security Act* to their own advantage. Dr. Hunter believes that the majority of New Zealand practitioners are acting honourably; at the same time he thinks that possibly exploitation may become more pronounced with the return of medical men from active service. This is by no means certain and it can only be said that time alone will show. Blame for most of the polypharmacy must, of course, be accepted by the practising doctors. In this short description of conditions prevailing in New Zealand there is no intention to sit in judgement on the Dominion or its practitioners. Medical men and women in Australia are vitally interested in this subject and they must try to see it clearly. They must therefore dissect the available facts, and where weakness or deficiency appears, look for a remedy. In no other way can they form an opinion on which to base their own decisions. In all these matters of exploitation, polypharmacy and the like, a great deal of the difficulty could be surmounted if, as Dr. Hunter suggests in regard to the operations of the pharmaceutical benefit, a professional disciplinary committee was set up and if the patient was required to pay directly a proportion of the cost. The value of a disciplinary committee or a committee of reference to deal with doctors who are "difficult" in their practices has been shown over and over again in several of the Australian States in connexion with friendly society lodge practice and workers' compensation practice. In conclusion, it would be wise in present circumstances to avoid comprehensive general statements or conclusions that cannot be substantiated.

Current Comment.

PULMONARY RESECTION IN TUBERCULOSIS.

THE treatment of pulmonary tuberculosis is becoming more and more surgical. Such procedures as the induction and maintenance of artificial pneumothorax, the section of adhesions, and crushing of the phrenic nerve, have become commonplace. The operation of thoracoplasty has become recognized as an important therapeutic measure; it is being employed more frequently and with less fear as physicians and surgeons alike realize its value and safety. For some ten years or so the radical procedure of extirpation of the diseased structure has been carried out in selected cases in various parts of the world, notably in America. A survey of sixty cases has recently been made by Richard H. Overholt and Norman J. Wilson. Overholt has performed 97 pulmonary resections for tuberculosis. In this review he excludes the first eighteen cases because in the early years the operative technique had not been properly developed and the selection of cases was not well standardized. He excludes also his latest cases because of the impossibility of assessing results in so short a period. During the period between January 1, 1942, and January 1, 1944, he performed 60 operations on 59 patients. Pneumonectomy was performed on 36 occasions and lobectomy on 24 occasions. The patients were classified according to the operative risk. Forty-seven were regarded as "reasonable risks" and thirteen as "desperate". In these thirteen pulmonary resection was regarded as the only procedure that held out the slightest hope of recovery. The operation may be regarded as justified when it is realized that five of the thirteen patients are now clinically well. The results in the other 47 cases were much better. Two patients died in the immediate post-operative period and one other died later of disease in the remaining lung. Thirty-one of the survivors are well and have no tubercle bacilli in the sputum. The age of the patients ranged from fifteen to fifty-four years. The majority were aged from twenty to forty years. The duration of the illness varied from less than six months to nineteen years. Tubercle bacilli were found in the sputum in 54 cases and tuberculous bronchitis was noted in nineteen cases. The great majority of the patients were affected with extensive, active, progressive lesions. In only fifteen cases did Overhalt and Wilson think that the simpler operation of thoracoplasty "might have been used with some hope of success". With regard to the technique of the operation, they point out that the difficulties are not as great as in resection for suppurative or malignant disease. Once the costal surface is mobilized the mediastinal surface is usually found to be relatively easy of access, and ligation of the hilar structures can be performed with ease. They stress the importance of gentleness in handling the pulmonary tissues, of ligating the hilar structures individually, and of covering the cut end of the bronchus with a pleural flap. They mention the necessity of observing by bronchoscopic examination the state of the bronchi prior to operation. Tuberculous bronchitis is not a contraindication to operation; but it is important for the surgeon to know whether it exists and in what situation. Overhalt and Wilson have examined 35 patients bronchoscopically since operation and have found tuberculous lesions in five of the bronchial stumps. They treat such lesions by the application of a 30% solution of silver nitrate through the bronchoscope.

It has become evident that in the hands of experts, resection of the lung has a place of importance in the treatment of pulmonary tuberculosis. Apart from the saving of life that it promises, the practice of this operation provides splendid opportunities for the study of the disease, as the work of Overhalt and Wilson shows. Their paper should be read by all who have special interest in pulmonary diseases.

[1] *The American Review of Tuberculosis*, January, 1945.

Abstracts from Medical Literature.

MEDICINE.

Rheumatic Fever.

R. F. WATSON, S. ROTHARD AND I. H. F. SWIFT (*The Journal of the American Medical Association*, September 30, 1944) discuss the use of penicillin in rheumatic fever. Rheumatic fever was generally preceded by infections with group A hæmolytic streptococci. Sulphanilamide had no beneficial effect in rheumatic fever. Eight young men with typical rheumatic fever were treated with penicillin intramuscularly every four hours during the night and intravenously every three hours during the day, or by continuous intravenous injection until from 1,975,000 to 3,470,000 Oxford units had been given in two weeks. There was no evidence that this treatment altered the course of the disease. Recourse was had to salicylates or acetylsalicylic acid in doses up to nine grammes per day during and after the penicillin treatment, with benefit in relief of pain and lowering of temperature.

F. P. FOSTER *et alii* (*ibidem*) have recorded results of treatment of acute rheumatic fever with penicillin. Thirty-eight cases were studied. In three cases the welfare of the patient necessitated cessation of penicillin and substitution of salicylates. In several cases the disease became more severe during penicillin treatment, possibly owing to the treatment, though the change may have been due to the natural course of the disease. The dosage employed was 25,000 units of penicillin given every three hours intramuscularly for five days or until one million units had been given. In 19 cases there was no change in the patient's condition as a result of treatment, in 18 cases the severity of the disease was increased, and in one case improvement was noted.

Impending Myocardial Infarction.

L. WAITZKIN (*Annals of Internal Medicine*, September, 1944) discusses the premonitory symptoms of acute myocardial infarction. He points out that in a patient previously well cardiac pain, however brief and mild, suddenly appearing during rest or customary activity, may imply existing or imminent myocardial infarction. Moreover, when anginal pains have been occurring for some time and suddenly become more readily precipitated by effort or begin to occur at rest, myocardial infarction may have occurred or may be imminent. He reports several cases in which impending infarction was suspected and every effort made to avert catastrophe by placing the patient at absolute rest. Serious and even fatal infarction occurred, nevertheless. In two of these cases increase in the erythrocyte sedimentation rate occurred during the period of observation.

Ulcerative Colitis.

ASHER WINKLESTEIN (*Journal of the Mount Sinai Hospital*, September-October, 1944) discusses ulcerative colitis in relation to its incidence, ætiology, pathology, clinical features, medical therapy and surgical therapy. The author states that typhoid fever has largely disappeared and ulcerative colitis has taken its place as the enteric disease. The term "indeterminate ulcerative colitis", defined as an ulcerative inflammation of undetermined ætiology, is preferred to the term "non-specific ulcerative colitis". About 5% of cases are unrecognized instances of chronic amœbic dysentery, and the author insists on a course of anti-amœbic therapy (emetine and "Carbarsone") in every case of so-called "indeterminate ulcerative colitis" as a therapeutic test. Another somewhat larger percentage are probably instances of chronic bacillary dysentery, the incidence of which approaches 15% to 20% in the author's cases. In the remaining 75% of cases in this disease, the true ætiology is unknown. The site of origin of this disease in most cases is the recto-sigmoid region from where it spreads, and when it is severe and diffuse 20% of cases show involvement of the terminal part of the ileum. About 10% to 15% of cases commence in the ileo-caecal region. In the author's opinion, ulcerative colitis is not related to regional ileitis. The mortality is high (10% to 15%), despite all known therapeutic measures. Toxicity and pathology are not always parallel, and sigmoidoscopy and X-ray examination are vital not only for diagnosis and localization, but also for prognosis. In regard to treatment, the author expresses the opinion that anti-amœbic therapy in every case is imperative, and if the condition is proved bacillary dysentery, sulphaguanidine and sulphasuxidine are now the best weapons. Restricted diets are unnecessary, but repeated transfusions are of the greatest value. The author prescribes a liberal non-residue diet, extra vitamins, opium, transfusions, and antitoxic *Bacillus coli* serum. Surgical treatment is still on trial in this disease. Ulcerative colitis remains definitely *"colitis gravis"*.

The Nature of the Muscle Spasm in Poliomyelitis.

R. P. SCHWARTZ *et alii* (*The Journal of the American Medical Association*, November 11, 1944) discuss the physiology of the anterior horn cells and other components of the lower reflex arc and describe the results of experiments made in recording action currents of voluntary and reflex muscular contractions in normal subjects and in persons suffering from poliomyelitis. They conclude that the "spine sign" is a manifestation of the spasm recorded in muscles of normal and subnormal strength. There is no correlation between the degree of spasm and the incidence of muscle weakness or paralysis. Spasticity and weakening are two separate phenomena each dependent on specific disturbances of the function of the anterior horn cells. In association with spasm certain functional abnormalities other than muscle weakness were observed in the lower reflex arc, such as spasticity of the antagonists of a weakened muscle from which a stretch reflex is being elicited. They could be most readily explained in terms of dysfunction at or proximal to the dendrites of the lower motor neurone, resulting in partial isolation of the lower motor neurone from the inhibition normally induced by impulses reaching it from other levels through long and short neural pathways. The degree of lower reflex arc isolation thus established and the degree of viability remaining in the lower motor neurones therefore determined the amount of muscle spasm in each instance.

Gamma-Globulin in Measles.

C. A. JANEWAY (*The Journal of the American Medical Association*, November 11, 1944) reports the administration by intramuscular injection of γ-globulin antibodies to children who had come in contact with others suffering from measles. The γ-globulins were prepared in the course of fractionating the plasma proteins from blood collected by the American Red Cross. The results of the injections were very satisfactory. It was found that the injection was best given on the fifth day after exposure: at this time a dose of 0·075 to 0·1 cubic centimetre per pound of body weight was found to protect most susceptible individuals completely, while one of 0·02 to 0·025 cubic centimetre was followed by mild measles in most cases. Reactions were noted after only 1·7% of 1,843 injections and were mild. The protection conferred by the antibodies was thought to last about three weeks.

M. GREENBERG *et alii* (*ibidem*, December 9, 1944) administered two cubic centimetres of γ-globulin to 814 household contacts of sufferers from measles. All were under the age of seven years. None developed "regular measles", but 21·3% had "modified measles". Of the latter, 92% had "mild measles" and 8% "moderate measles".

Anthrax Treated Successfully with Penicillin.

F. D. MURPHY *et alii* (*The Journal of the American Medical Association*, December 9, 1944) report the treatment with penicillin of three persons suffering from uncomplicated cutaneous anthrax without bacteriæmia. Prompt and excellent response was observed in every case, the bacilli disappearing rapidly from the lesions. The dose recommended is 100,000 units daily for two to four days.

Time-Activity Curves of Globin Insulin with Clinical Applications.

HELEN EASTMAN MARTIN, D. G. SIMONSEN AND NORADEANE H. HORMANN (*The American Journal of the Medical Sciences*, September, 1944) report the results of a study of the time-activity function of globin insulin with the clinical application of the results to the optimum arrangement of the diet. The study is based on (i) a summary of eight time-activity curves, with doses of globin insulin ranging from 10 to 18 units; (ii) a comparison of the time-activity curves of the same dose of regular, protamine zinc, and globin insulin in two cases; (iii) the globin insulin curves of 14 patients on a regular diet; and (iv) the out-patient progress records of 16 patients on globin insulin. The time-activity curve was used as a determination of the total duration of action and the activity per hour of the globin insulin. The method used was the administration of

glucose by mouth at variable intervals in an amount required to keep the blood sugar level within the physiological range of 80 to 120 milligrammes per 100 cubic centimetres, as determined by repeated blood sugar estimations, after the injection of the dose of insulin to be studied. The results showed that the duration of activity varied with the dose of the insulin and the severity of the diabetes, but in general was 14 to more than 24 hours with an average of 18 to 19 hours. The peak of activity occurred between the sixth and tenth hours, and the onset of activity started within one hour of injection, but was slow for the first three to five hours. Comparison of the time-activity function of the same dose of regular, protamine zinc, and globin insulin given to two patients showed that globin insulin was intermediary between regular and protamine zinc insulins as to duration and total carbohydrate-handling ability. Blood sugar curves with diet indicated the necessity for a light breakfast, mid-afternoon feeding, and in some instances a bedtime feeding. The authors conclude that the advantages of globin insulin are manifested (*a*) by patients whose diabetes is controlled with protamine zinc insulin who have severe nocturnal reactions, (*b*) by patients whose diabetes is controlled on a combined dose of regular and protamine zinc insulin before breakfast injected singularly or combined, (*c*) by more carbohydrate handling ability than with protamine zinc insulin, and by earlier peak of action, (*d*) by a clear solution obviating mixing. The disadvantages are (*a*) too low hourly carbohydrate-handling ability to cover diet in most patients with severe diabetes—doses of over 50 units, (*b*) too short duration of effect to cover nocturnal insulin requirement of patients with severe diabetes, (*c*) burning on injection in an occasional patient.

Penicillin found Useless for Rheumatoid Arthritis.

E. W. BOLAND *et alii* (*The Journal of the American Medical Association*, November 25, 1944) administered penicillin in large doses to ten soldiers with early but progressive rheumatoid arthritis without producing any distinct benefit.

Typhus Fever.

T. E. WOODWARD AND E. F. BLAND (*The Journal of the American Medical Association*, September 30, 1944) have recorded some clinical observations on typhus fever, with special reference to the cardio-vascular system. The question was asked whether the symptoms of circulatory collapse in typhus were due to cardiac weakness or to peripheral circulatory weakness. In typhus rickettsiæ invade the heart and blood vessels, causing swelling of the endothelial cells and actual thrombosis of smaller and sometimes larger vessels, this causing multiple foci of necrosis in skin, liver, kidney, heart, voluntary muscle and brain and in every organ of the body. Clinically the heart was rarely involved, though the pulse was often rapid and feeble. Tracheo-bronchitis was common. Blood pressure was usually low, the systolic pressure being often down to 70 millimetres of mercury and the diastolic from 40 to 60 millimetres. Electrocardiographs of 24 patients showed low voltage of *QRS* in seven cases, slight prolongation of *P-R* interval in six, low voltage *T* waves in all, depression of *S-T* in two, and auricular fibrillation in one. Red cell counts varied from 2,500,000 to 3,500,000 per cubic millimetre, and the leucocyte counts were generally low (4,000 to 6,000 per cubic millimetre). The serum protein content was diminished, and the blood chloride level was lowered. Oliguria was usually noted, but other urinary abnormalities were rare. The non-protein nitrogen level was always raised in seriously ill patients, a figure of 90 milligrammes *per centum* being not uncommon. The administration of fluids and chlorides often reduced this to 30 milligrammes *per centum* in three or four days. meningismus occurred in several cases, and lumbar puncture yielded fluid either normal or under increased pressure. The number of cells was increased in two cases. Complications included *otitis media*, parotitis, dry pleurisy and phlebitis. Among 679 patients suffering from typhus there were 81 deaths. Treatment included proper nursing, the administration of 4,000 cubic centimetres of fluid daily either by mouth or intravenously, 50% glucose solution for oliguria or anuria, blood transfusions, ammonium chloride two to four grammes, and three to five grammes of sodium chloride by mouth. As full a diet as possible was given, and an indwelling stomach tube was used if vomiting was severe. Digitalis and cardiac drugs were not of value as a rule, since the circulatory collapse was mainly peripheral. Iron was useful in convalescence for the anæmia.

Lactic Acid: A Corrosive Poison.

E. GORDON YOUNG AND RALPH P. SMITH (*The Journal of the American Medical Association*, August 26, 1944) have investigated the deaths of three premature infants fed on the same lactic acid and milk mixture, which, unfortunately, was thrown out and was therefore not available for analysis. The deaths were due to an acute hæmorrhagic and gangrenous gastritis, probably resulting from the administration of an acid milk mixture containing too high a concentration of lactic acid. After administration by mouth of a lactic acid milk mixture containing 10·1 grains in 30 cubic centimetres to four rabbits, death followed in one instance in ten minutes, and in the others in two, six and forty hours. The symptoms and findings were identical with those of the infants and death was attributed to acute hæmorrhagic gastritis. There was a moderate degree of acidosis. Lactic acid must therefore be regarded as a corrosive poison, and due care must be exercised in its use as an infant food.

Immunity Responses to Mixtures of Diphtheria Toxoid and Pertussis Vaccine.

LOUIS W. SAUER *et alii* (*The Journal of the American Medical Association*, August 5, 1944) state that a satisfactory mixture of diphtheria and pertussis antigens when injected subcutaneously should not be followed by a severe systemic or local reaction. It should produce a high incidence of prolonged protection against each disease. The duration of immunity should approximate that produced when each antigen is injected singly (at different times) or when injected simultaneously (separately). The component antigens should be stable for at least a year. If effective, the number of injections for the protection against these two diseases could thus be cut in half. The mixture should be safe for general use in institutions, health department clinics and private practice. The authors tested 464 infants, beginning with those eight months of age. The preliminary Schick test (before the first injection) gave a positive result in 96% of cases; the result of the preliminary pertussis complement fixation test was negative in 95%. When retested six weeks after the final dose, 98% of the infants injected simultaneously (antigens separate) gave no reaction to the Schick test, and 91% gave a "+++" or "++++" response to the complement fixation test. Of infants injected with the mixed antigens, 95% gave a negative response to the Schick test and 73% gave a "+++" or "++++" response to the complement fixation test. After a "stimulating" dose of two cubic centimetres of plain pertussis vaccine (15,000 million bacilli per cubic centimetre), all infants who gave a less than "+++" response subsequently gave a "+++" or "++++" complement fixation response. Forty-four infants who did not react to the Schick test and who gave a "+++" or "++++" response to the complement fixation test after the injection of mixed antigens were retested one or two years later. Their responses to the Schick tests and pertussis complement fixation tests still revealed high immunity. Up to July, 1944, none of these 464 infants inoculated between 1938 and 1941 were known to have developed either disease. A much higher immunity was obtained when three doses were given at three weekly intervals than when a dose was given every week.

The Biosynthesis of Riboflavin in Man.

V. A. NAJJAR *et alii* (*The Journal of the American Medical Association*, October 7, 1944) have shown that persons fed on purified vitamin-free foods supplemented by pure vitamins and receiving less than 100 micrograms of riboflavin per day not only subsisted without any sign of deficiency of this vitamin, but continued for the twelve weeks of the experiment to excrete riboflavin: in the urine the amount was roughly twice the intake and in the fæces five or six times the intake. The phenomenon was attributed to synthesis of riboflavin by the intestinal bacteria; but the administration of succinylsulphathiazole did not appear to interfere with the process. The authors conclude that riboflavin is not a dietary essential under all conditions.

The Role of the Biliary System in Atrophic Arthritis.

HARRY GAUSS (*The American Journal of Digestive Diseases*, September, 1944) discusses the relationship of the biliary system to atrophic arthritis. His attention has been focused on the subject by the not infrequent freedom from arthritic symptoms, following cholecystectomy, of patients suffering from both arthritis and cholelithiasis. He attempts to elucidate the connexion, if any, between these two diseases.

British Medical Association News.

NOTICE.

The General Secretary of the Federal Council of the British Medical Association in Australia has announced that the following medical practitioners have been released from full-time duty with His Majesty's Forces and have resumed or will resume practice as from the dates mentioned:

Dr. F. V. Munro, 135, Macquarie Street, Sydney (February 2, 1945).

Dr. H. Hunter Jamieson, 160, Pacific Highway, North Sydney (April 1, 1945).

Medical Societies.

MELBOURNE PÆDIATRIC SOCIETY.

A meeting of the Melbourne Pædiatric Society was held on August 9, 1944, at the Children's Hospital, Carlton, Melbourne, Dr. Alan McCutcheon, the President, in the chair.

Sarcoma of Spine with Compression Paraplegia.

Dr. J. W. Grieve presented a male child, aged three years and eleven months, who had been admitted to the hospital on June 6, 1944. He had suffered from scarlet fever eight weeks prior to his admission, and for this illness he was kept in bed for three weeks at home, after which he was allowed up and remained well for one week. He then complained of lumbo-sacral pain, especially when he was jolted, or even when in bed. Three days prior to his admission to hospital weakness of both legs developed, which became progressively worse, so that he was unable to stand. On examination, he was flushed. The temperature was 98·2° F. and the pulse rate 128 per minute. The heart, lungs and abdomen were clinically normal. The tonsils were large, unhealthy and inflamed. Examination of the central nervous system revealed active reflexes in the left upper limb; those of the lower limbs were equal, but hyperactive; both plantar responses were extensor in type. The power of the upper limbs was good, but that of the legs was uniformly poor, the only possible movement being that of adduction. The muscle tone appeared good, but it was not possible to make tests for sensation. X-ray examination of the spine on June 11 revealed no bony abnormality. The Mantoux test failed to produce a reaction. On June 15 diminution of sensation from the lower dorsal segments downwards became apparent. The patient voided urine frequently, and his bed was usually wet.

Complete neurological examination by Dr. E. Graeme Robertson on June 22 revealed almost complete paraplegia with loss of the lower superficial abdominal reflexes, increase in the left knee and ankle jerks and extensor plantar responses. The only movement seen was in the right thigh. Below the umbilicus superficial sensation was greatly reduced. The patient could interpret gross but not fine movement of his toes. The evidence suggested a transverse lesion of the spinal cord at the ninth thoracic segment at the level of the sixth thoracic vertebra. X-ray examination revealed clear pedicles, except the left pedicle of the eleventh thoracic vertebra, and the suggestion of a soft tissue shadow in this region. Lumbar puncture showed the cerebro-spinal fluid pressure to be 60 millimetres, which was not altered by jugular pressure. Crying and abdominal pressure resulted in a rapid rise of cerebro-spinal fluid pressure to 300 millimetres, release being followed by a rapid fall. The fluid was faintly yellow and on analysis was shown to contain a few red cells, 709 milligrammes of chloride, and over 100 milligrammes of total protein per hundred cubic centimetres. The globulin content was increased, as tested by the Nonne-Apelt technique. One hundred cubic centimetres of cerebro-spinal fluid were replaced by twelve cubic centimetres of air, to determine the lower border of the lesion, as clinical evidence did not correspond to the radiographic appearance. Films were taken, and the oxygen column failed to rise beyond the twelfth thoracic body. It began to narrow opposite the second lumbar vertebra and opposite the lower tip of the twelfth thoracic vertebra. The thin column lay against the anterior left wall of the theca. There appeared to be an abnormality of the left pedicle of the eleventh thoracic vertebra, with a soft tissue shadow external to the spine spreading a short distance upwards. The dorsal part of the body of the eleventh thoracic vertebra appeared to be thin. Since there was no tenderness or elevation of temperature the lesion was thought to be of tuberculous origin rather than due to pyogenic osteomyelitis. An examination of the leucocytes on the following day showed that they numbered 20,800 per cubic millimetre; 73% were polymorphonuclear cells, 20% lymphocytes, 6% monocytes and 1% eosinophile cells. As a result of this it was thought that the lesion was due to a pyogenic condition, and the possibility of exploration was entertained for the first time. The Wassermann test failed to produce a reaction. On June 30 a plaster bed was made, in which the patient was immobilized. He was still incontinent of urine and had incontinence of fæces on one occasion. The number of leucocytes had fallen to 8,400 per cubic millimetre, and the possibility of neoplasm came under consideration.

The spine was radiologically examined again on July 4. Bony erosion of the posterior third of the body of the eleventh thoracic vertebra was seen. The destructive process extended into the left pedicle and transverse process. A shadow suggestive of soft-tissue extension was present to the left of the eleventh thoracic vertebra and extended as far as the eighth thoracic vertebra. A coccal rather than tuberculous osteitis was suggested.

The operation of costo-transversectomy was performed on July 10. One and a half inches of the eleventh rib on the left side were resected from the medial aspect, and an oozing mass of œdematous granulation tissue was revealed. After the bone had been nibbled away, a large cavity was exposed, extending into the body of the vertebra, almost completely destroying the pedicle. The cavity was curetted and granulation tissue was obtained. The theca and cord were exposed, but not opened. The patient was given 5,000 units of penicillin intramuscularly every three hours and replaced on the plaster bed. On July 29 the pathologist reported in the following terms on the granulation tissue. "Section is that of a malignant connective tissue tumour of homogeneous round-celled structure. Within the limits of the small biopsy sections the tissue is quite anaplastic and undifferentiated." Deep X-ray therapy was commenced on July 28, and on July 31 the hæmoglobin value was 80% and the leucocytes numbered 7,100 per cubic millimetre. Dr. Grieve said that the child had been affected by the daily treatment, but his condition was now improving considerably. No change had occurred in the state of his limbs, beyond a slight increase in the muscular rigidity. The lesion had presented the classical signs of compression paraplegia and was thought at first to be a streptococcal abscess occurring as a sequel of the original scarlatina. Subsequent investigations had revealed it to be a malignant tumour of great rarity, as the literature included few such cases.

Dr. Robert Southby asked whether it was considered unusual that the wound should have healed by first intention in the presence of a bone sarcoma.

Dr. E. Beavis said that he had been present during an operation performed in a similar case by Dr. H. C. Trumble at the Alfred Hospital. The tumour was almost identical. It was growing within the vertebral canal, surrounding the cord and producing compression symptoms. The vertebra also was involved. After the operation healing occurred by first intention. Histologically the tumour proved to be a sarcoma.

Aortic Stenosis of Rheumatic Origin.

Dr. Grieve also showed a boy, aged twelve years, whose past history included scarlatina at the age of five years and rheumatic pains at the age of eight years. He had first been admitted to the hospital on June 29, 1942, at the age of ten years. He complained of right-sided abdominal pain at the time. The appendix was thought to be the offending organ, and it was removed, although at the operation it appeared to be free from disease. A systolic murmur was present at all areas prior to the operation. After the operation acute pericarditis developed, a pericardial friction rub being easily audible. A loud diastolic bruit also appeared at the base, and as a Corrigan's pulse could be demonstrated, a diagnosis of aortic regurgitation was reached. Recovery was slow from this illness. He was readmitted to hospital on September 29, 1943, suffering from pericarditis and congestive cardiac failure. Rheumatic nodules were now manifest, and to-and-fro murmurs were audible at the aortic area. Congestive cardiac failure recurred on April 26, 1944, and improvement from this had been very gradual.

Dr. Grieve said that the apex beat was now in the sixth space, three and a half inches from the mid-sternal line. A systolic thrill was detectable over the base of the heart. The second sound was replaced by a diastolic murmur. Harsh to-and-fro murmurs from the aortic area were conducted to the root of the neck, where a systolic thrill was detectable over the large arteries. Rheumatic nodules were visible on the fingers and at the elbows. Dr. Grieve thought that the case was interesting, as he had not previously seen an aortic stenosis of rheumatic origin.

DR. HENRY SINN said that the lesion was very rare indeed. Among the large number of patients totalling over 400 attending the rheumatic clinic, he could not recall a similar instance. Carey Coombs, after autopsy study of 100 rheumatic hearts, showed that the mitral valve was affected in every case, the aortic valve in approximately fifty cases, the tricuspid value in twenty cases, and the pulmonary valve in only two cases. The frequency of clinical evidence of aortic valve involvement was much less, probably about 5% to 10%, so that it would be possible amongst the thirty or forty patients at the Frankston branch of the hospital to find only three or four with clinical signs of aortic disease. Almost invariably the signs were those of aortic regurgitation, and they were accompanied by signs of mitral involvement. It was unusual for the signs of aortic valvulitis to predominate, and still more uncommon for them to be present without clinical evidence of mitral valvulitis. Aortic stenosis as the outstanding lesion was unique. Dr. Sinn said that it was also unusual for signs of aortic valvulitis to occur after the first attack; they usually followed second and third attacks. In his opinion the prognosis was made more grave by the development of clinical evidence of aortic disease, and he viewed with pessimism the outlook in the case under discussion. Dr. Sinn said that with regard to rheumatic oddities, he was surprised to find two cases of auricular fibrillation during his last visit to the rheumatic patients at Frankston. He had not seen auricular fibrillation in a child before this for many years. He had been struck, too, by the outbreak of rheumatic pericarditis in very young children which had occurred in Melbourne two or three months earlier. Children two and three years of age were afflicted, and the mortality rate was extremely high. That, to say the least of it, was disturbing, when one was inclined to teach students that rheumatic fever was rare under the age of five years and unknown under the age of three years. However, such cases added more force to the saying that there was nothing new under the sun.

DR. ROBERT SOUTHBY said that he was interested in the manifestations of abdominal signs in a child suffering from rheumatic fever. He recalled two instances, in each of which an acute condition of the abdomen was suspected; but discretion prevailed, and the lesion subsequently proved to be rheumatic heart disease. Referring to prognosis, Dr. Southby spoke of a child who had been an inmate of the hospital for nearly twelve months, suffering from extensive carditis. At the age of sixteen years, he qualified for the invalid pension. Twenty-one years after his sojourn at the hospital, he was still alive, but was dyspnœic on slight exertion. Dr. Southby concluded by asking whether the Wassermann test had been performed.

DR. ALAN MCCUTCHEON referred to a child, aged seven or eight years, who had a temperature of 100° F., a faint systolic bruit at the apex of the heart, and pain in the right iliac fossa. Acute appendicitis was thought to be the most likely diagnosis. Dr. A. Derham, who was also concerned, suspected right basal pneumonia. Dr. G. Scantlebury, however, favoured early rheumatic carditis. When pressed for the basis of his diagnosis, Dr. Scantlebury replied that it rested on the outward appearance or diathesis of the child. Subsequently the illness ran the typical course of rheumatic fever.

Dr. Grieve, in reply, said that the Wassermann test had not been carried out. Abdominal pain was a problem in certain cases of rheumatic fever. It was not difficult to understand how this pain was brought about, for at autopsy the inflamed pericardium could be seen in many cases sitting on top of the diaphragm and it was not unusual as well to see exudate on the under surface of the diaphragm.

Congenital Goitre.

DR. N. WETTENHALL discussed four children suffering from congenital goitre. The first was a male child, aged four weeks, who had been admitted to the hospital on March 16, 1944, with the diagnosis of œsophageal diverticulum. The history given was that since birth the baby had had two swellings in the neck which varied in size and seemed larger during and after feedings; moreover, the baby regurgitated food after his feedings. Pregnancy and delivery had been normal. The masses were described as two rounded swellings in the neck, the larger on the right side, continuous with the easily palpable isthmus of the thyreoid and moving with it on swallowing. They were not fluctuant, but seemed to consist of soft substance. Pressure on the larger lump caused food to course back into the mouth, and then the baby vomited. However, the condition was recognized as congenital goitre, and further investigation revealed that the mother also had a moderately uniform, non-toxic enlargement of the thyreoid gland. She came from Corryong, near Mount Kosciusko, in a district where goitre was endemic. Both mother and child were given *Syrupus Ferri Iodidi*, and the child was discharged from hospital on March 29, apparently perfectly well, though the goitre was still present.

Dr. Wettenhall's second patient was a male, who was aged twelve days when admitted to hospital on August 7, 1941, with the diagnosis of goitre of the newborn. The history was typical. The baby was born with a large œdematous mass in the neck extending from the clavicle to the mandible and more pronounced on the left side, and he was cyanotic and "mucousy". The swelling subsided rapidly in seventy-two hours, and the associated symptoms diminished at the same time. However, cyanotic attacks still occurred when the child was moved, so much so that the doctor who sent the child to hospital had considered congenital heart disease the most likely diagnosis. Examination on the child's admission to hospital showed him to be a rather dusky infant with a mild grade of cyanosis, more pronounced when he was moved, but relieved by sitting up. Respiration was somewhat wheezing, and in the neck there was a nodular, symmetrical, soft, extensive enlargement of the thyreoid gland involving both isthmus and lateral lobes. Hypothyreoidism was suspected in this child, as it was noted that he had coarse thick features, no eyebrows, and a large tongue. X-ray examination of the chest revealed an enlargement of the thymus, and this persisted unaltered during the child's stay in hospital. Treatment consisted of the administration of both *Thyroideum Siccum* (one-sixth of a grain three times a day) and *Syrupus Ferri Iodidi* (five minims twice a day). This was continued for two months; by that time the goitre was much smaller, cyanotic attacks occurring only with crying spasms, and the child was well and gaining in weight. He was not finally discharged from hospital till January 23, 1942; but the latter part of his stay in hospital was due to various intercurrent infections. On his discharge, the goitre was hardly palpable and the infant's general condition was good, though he still appeared subnormal. In this case the mother also had a goitre, as did several of her sisters. The family came from South Gippsland, which was also an endemic goitre area.

Dr. Wettenhall's third patient was a male, who at the age of three days had been admitted to hospital on March 24, 1944, from the Women's Hospital. Pregnancy and labour had been normal; but when the infant came to be fed it was found that he vomited almost at once after a bottle feeding, and that feeding by gavage had to be used to relieve the vomiting. A large cystic mass in the neck had also been noticed to be causing some respiratory obstruction. On general inspection the baby was of good colour, though liable to cyanotic attacks, and appeared normal apart from the mass in the neck and a slight degree of maldevelopment of the ears. The mass appeared to consist of three large cystic swellings, one in the mid-line anteriorly and one on each side extending up as far as the mandible. Clinically, this tumour appeared quite as large as that present in the fourth case. An attempt was made to aspirate one of these cystic swellings, but no fluid was obtained. An X-ray examination of the chest showed some broadening of the mediastinum, probably due to the thymus, and this persisted unchanged throughout the child's stay in hospital. Dr. Wettenhall said that the child was treated with thyreoid and Lugol's iodine, and the swelling steadily decreased in size during the next few months, though no claim was made that the medication was responsible. The baby failed to thrive for more than two months, and presented a difficult nursing problem, though cyanotic attacks occurred only occasionally after the first fortnight. The child was eventually discharged from hospital on July 1, 1944, and as could be seen, he was now a healthy baby, though the enlarged thyreoid isthmus was still readily palpable. The mother of the baby was of interest, as she had a mild colloid goitre which increased noticeably in size during the later months of pregnancy. It was also notable that she had been taking potassium iodide, ten grains three times a day, for two years, as she suffered from asthma, and that the iodine thus provided did not protect the child from developing

a congenital goitre of large dimensions. She lived in Chelsea, which was not an endemic goitre area.

Dr. Wettenhall's fourth patient was a male, who when aged four days had been admitted to the hospital on June 16, 1944, suffering from congenital goitre. Pregnancy and delivery had been normal, and the only abnormal feature in the history was that the baby had taken his feedings with difficulty. The child was described as a miserable little baby attached to a lump in his neck, with some stridor and difficulty in respiration. This mass consisted of a large central swelling in the neck extending from below the hyoid to the suprasternal notch, with two lateral lobes extending up along the sterno-mastoid almost as far as the mandible. These masses were obviously enlarged thyreoid glands causing some pressure symptoms. The baby was difficult to feed even by gavage, was constantly having cyanotic attacks, and died on September 21, 1944. The mother in this case also had a colloid goitre, and like the mother of the third child she also suffered from asthma, though she had not been taking iodides recently. She had lived in Melbourne all her life. An autopsy on the infant was performed by Dr. R. Webster, and Dr. Wettenhall said that his description was of interest, as it showed that the child's mode of death was from asphyxia due to pressure by the goitre. Portion of Dr. Webster's report was as follows:

> The body was that of a rather poorly nourished newborn infant exhibiting a tumour in the neck of configuration and situation suggestive of an enlargement of the thyreoid gland. Dissection of the swelling confirmed the clinical diagnosis of enlarged thyreoid gland, the veins issuing from which were very large and full of blood. On the left side the lateral lobe was prolonged into a truncated process of about the circumference of an adult finger, to a point just below the angle of the jaw; the right lateral lobe was of similar dimensions, but was not quite so elongated. The isthmus of the thyreoid could not be recognized as such, having lost its identity in a general hyperplasia which caused the gland to envelop the trachea completely and to extend upwards and submerge the thyreoid cartilage, thyreohyoid membrane and hyoid bone. The last-mentioned structure was actually embedded in thyreoid tissue. At the same time there was no distortion of the trachea and the lumen was not grossly narrowed. The extension seemed to take a cranial rather than a caudal direction and there was a clear interval of at least one centimetre between the lower border of the goitre and the *manubrium sterni*. The dimensions of the enlarged thyreoid gland were approximately five and a half centimetres cranio-caudally, five centimetres transversely and three centimetres antero-posteriorly. The weight was one and three-quarter ounces (approximately fifty grammes). Macroscopically, the cut surface was dark red in colour and fleshy and did not give the impression of the high colloid content which was revealed in the microscopic section. The histological structure was found to be that of a simple hyperplasia of the gland, the vesicles without exception being distended with colloid. Many of the vesicles were unduly dilated, but such dilatation scarcely amounted to cyst formation.
>
> The lungs showed scattered subpleural petechiæ and in each lung a few patches of interstitial hæmorrhage. The great veins at the base of the heart were very distended, as were the auricles, with dark fluid blood. There was an appreciable degree of dilatation of all the cardiac chambers, and the appearances in the heart and lungs suggested an asphyxial mode of death.

Dr. Wettenhall said that his congenital goitre patients were discussed because two of them had been in the hospital in 1944, and because in a search of the hospital in-patient records back to 1930 only two others were found, both recorded in 1941. The incidence in other parts of the world, particularly in endemic goitre areas, appeared to be much higher; for instance, McCarrison had found that 60% of infants in the Himalayas were born with congenital goitre, and Wieland in Switzerland stated that congenital goitre was common in that country. However, surprisingly few instances of sporadic congenital goitre were described in the literature, though it was possible that if a systematic examination of the necks of all newborn infants was made, many more congenital goitres would be detected. The ætiology of the condition was not known definitely, though the relationship between goitre in the parents and in the infant was well recognized. Quite often both parents had a goitre; more frequently only the mother was affected; but no case could be found in which only the father was affected. On the other hand, many infants were born without a goitre when the parents had goitre, and goitrous babies were born to parents not affected by goitre. There was said to be more likelihood that a child would be born with a goitre when the mother's goitre became enlarged during pregnancy, and Skinner in Washington, which was an endemic district, claimed to have prevented congenital goitre by giving mothers iodine during pregnancy.

Dr. Wettenhall went on to say that the normal weight of the thyreoid gland at birth was one or two grammes, and in goitre belts up to five to ten grammes. Thyreoids larger than that might be regarded as congenital goitres; but rarely did they weigh more than 30 grammes. The largest described weighed 57 grammes, and another weighed 45 grammes, so that the goitre shown at the meeting was amongst the "mammoth" class. Macroscopically the thyreoid was circular in type—it completely, or almost completely, encircled the trachea, but a retrosternal extension was rare. Not uncommonly there was an associated thymic hyperplasia. Microscopically the same variations were found in these goitres as in those from adults, though colloid goitres were the most common type. During pregnancy an enlargement of the thyreoid in the fœtus gave rise to no recognizable symptoms, but during labour it might result in abnormal presentations, such as a face presentation or a persistent occipito-posterior presentation. There was also another effect, namely, increased congestion of the thyreoid gland itself, so that it might become large enough to compress the trachea and possibly cause asphyxia. After birth congenital goitre might give rise to one of three sets of symptoms. It might be latent and symptomless, and subside with or without treatment. It might gradually increase in size and produce mild pressure symptoms. It might be fulminating in type, and this was the type likely to make hospital treatment necessary. The symptoms depended on the size of the goitre, and also on the fact that the goitre was almost always circular and thereby readily exerted pressure on the trachea and œsophagus as well as on other structures in the neck. The characteristic features were the lump in the neck associated with dyspnœa, dysphagia, cyanosis and engorged neck veins, and possibly a weak cry from pressure on the recurrent laryngeal nerves. In such a case there was the real danger that the child might suddenly die from asphyxia. Occasionally, there were associated signs of thyreotoxicosis or myxœdema.

Dr. Wettenhall then said that as in so many other conditions, prevention was better than cure. Skinner maintained that any goitrous woman ought to be treated prophylactically during pregnancy, especially if she was known to have previously given birth to a goitrous child. Hypothyreoid mothers should be given thyreoid extract, and it should be recommended that all non-goitrous women in endemic regions should have some iodine medication at least in the early months of pregnancy. Many congenital goitres were latent and required no treatment, and this observation also applied with mild pressure symptoms, which often subsided after a week or two. The chief danger was in the first week of life, and particularly soon after delivery. If the child was born in a state of asphyxia, traction on the jaw and also on the tumour might help, and immediate subtotal thyreoidectomy had been recommended by Crotti in America. If the infant survived delivery, careful nursing was still required and was probably the most essential requisite for recovery. The baby should be nursed in the most comfortable position for it to breathe, which might be sitting up or possibly lying with a support behind the shoulders. Direct breast-feeding or even sucking from the bottle might be excessively distressing, and gavage feeding had to be instituted in two of the cases discussed. Both thyreoid extract and Lugol's iodine had been used therapeutically, but it was difficult to assess their value, as in many cases the lesion subsided spontaneously. Vascular congestion of the thyreoid seemed to be a factor in the causation of symptoms, and the application of ice packs to the neck had been suggested as a means of relieving acute asphyxial attacks. In summary, if a child survived the first week of life, the chances for its recovery were fairly good.

Dr. Eric Price said that he would like an explanation of the actual nature of the condition and how it was distinguished from endemic goitre occurring in children of goitrogenous mothers.

Dr. Robert Southby said that he was concerned with a baby from Preston suffering from the condition. The mother also had a thyreoid swelling. The swelling in the baby's neck was diffuse. It settled down quickly with the exhibition of small doses of thyreoid extract, and over the last two months had almost subsided.

DR. J. W. GRIEVE said that one of the cases was interesting, in that the lesion presented as an inflammatory type of reaction in the neck of a newborn infant. However, the child also presented signs of hypothyreoidism. Dr. Grieve said that he had seen the fourth baby on the day of birth. The child presented the signs of respiratory distress, and Dr. Grieve was worried about the mechanical difficulty of obtaining aeration of the lungs. The autopsy specimen illustrated well how easily the trachea might be compressed with congestion occurring in the thyreoid gland.

Dr. Wettenhall, in reply, said that he did not think there was any difference between goitre of the newborn and endemic goitre. He had discussed the cases because in this country they were regarded as rare. The commonest type of goitre met with was a circular goitre enveloping the trachea, associated with a danger of compressing that structure. Pathologically, the commonest type was a diffuse colloid goitre, differing in no wise from that found in adults.

AUSTRALIAN SOCIETY OF ANÆSTHETISTS.

A LIBRARY AND MUSEUM OF ANÆSTHESIA.

ALREADY before the war, the Australian Society of Anæsthetists had begun to build up a central library and museum of anæsthesia on the premises of the Royal Australasian College of Surgeons, Melbourne. It is important that the old books and apparatus should be collected and housed in safety before they become dispersed and lost. It is probable that much valuable material exists in the garages of doctors, in the top shelves of booksellers and instrument-makers, and in the junk rooms of hospitals. The cooperation of medical men is sought in recovering this material. The secretary of the society will be grateful for the opportunity to acquire, by gift, purchase or exchange, books and appliances of this description.

Correspondence.

PHARMACEUTICAL BENEFITS ACT, 1944.

SIR: In this column of your journal there has appeared a considerable amount of controversy in regard to the above subject. I do feel, like the correspondents from the Sixth Division Headquarters, that a school of red herrings has been thrown across the path of reason.

We are taught, and proudly assert, that we live in a democracy; the Government, elected by the majority of the people who have exercised their franchise according to the stated platforms of the contesting parties, has decided to give effect to a portion of such platform; the Government has decided, either wisely or unwisely, that the pharmaceutical benefits shall be limited to a formulary. Is it right, is it loyal for a section—and a very small section at that—to state that the Government's decision to limit the benefits to a formulary is wrong, and, further, that it will advise its members not to cooperate with the Government? Is it in keeping with the dignity of the profession to stage a "sit down" strike against the Government?

I have been a medical officer to friendly societies for the past twenty years; I know, and the Council of the New South Wales Branch knows, that whereas I can freely prescribe anything I deem necessary for my lodge patients, nevertheless the friendly societies limit their benefits; they issue me with a formulary which they prefer me to use; and in their contract with their members certain official drugs are excluded. I cannot ever remember the Branch raising any objection to this practice of making lodge members pay for certain official drugs and for proprietary lines. Consequently I cannot see how cooperation with the Government would mean, as Dr. A. J. Collins states, sacrifice of our freedom in prescribing. But it would confer benefits on the old-age and invalid pensioners, who, at present upon their munificent pension of 27s. 6d. per week, must provide their own pharmaceutical needs.

Dr. Collins also states in his communication to THE MEDICAL JOURNAL OF AUSTRALIA of the seventeenth instant, that "the bulk of the Australian people today are in well-paid employment and can well afford to pay for most medicines". Before making such optimistic statements he should make sure of his facts. It is true that fewer workers than ever are on the basic wage, but quite a fair percentage are in the lower wage group. Two thousand members in the Ironworkers' Union (total membership 14,000) are in receipt of £5 10s. per week or less. For a man, wife and child eleven shillings must be deducted from this to estimate his net wage.

At a recent meeting of the Section of Sociological Medicine, it was shown that in the estimation of the basic wage medical and pharmaceutical expenses were estimated by reference to friendly societies' dues. It was also clearly demonstrated that it was impossible upon the basic wage for a worker to provide for himself and family the minimum food values both in Calories and protective food substances by the amount allowable for sustenance. No allowance was made at all for an annual vacation.

To say that the bulk of workers can afford to pay for most medicines is quite incorrect, misleading, and demonstrates a poor conception of the financial conditions in most industrial homes. An excellent education would be provided for most doctors if they worked in an industrial district for many years.

Yesterday I visited a lodge patient who is a porter working in one of the airway lines in Mascot. His wage is £5 2s. a week, from which is deducted six shillings and threepence for income tax purposes. His rent is 25s. per week. It would be interesting to know how this man can afford at times necessary pharmaceutical needs for his family (a wife and two children).

Yours, etc.,

C. JAEDE.

Mascot,
March 23, 1945.

AN X-RAY SURVEY OF MINERS' CHESTS.

SIR: Referring to the letter on the above subject by Dr. J. G. Edwards in your issue of the twenty-fourth instant, I would be very grateful to Dr. Edwards for further information concerning any miners in whom, to his knowledge, years of exposure to pure coal dust produced no distinctive X-ray picture, but whose lungs, at post-mortem examination, were "almost solid from coal deposit". I should particularly like to know the full industrial history of any such miners, and whether the lungs concerned were subjected to detailed pathological examination and proper chemical analysis.

From my own observations in studying the pathology of the lungs of coal miners, I can hardly imagine that lungs "almost solid from coal deposit" would not exhibit extensive nodular fibrosis and probably fibrous consolidations as well.

Evidence of such fibrosis would surely be seen on X-ray examination, in which case the changes in films of the miners concerned would differ considerably "from those seen in the ordinary labourer of similar age", provided the latter had not had any significant dust exposure.

Quite apart from the X-ray findings, the lungs of coal miners with nodular fibrosis differ both pathologically and on chemical analysis from lungs showing silicosis. The latter term should be reserved only for the disease which occurs following the inhalation of dust containing a very large amount of free silica, such as sandstone or quartz, which contain over 90% free silica. As the amount of free silica in coal dust is very small, it is not scientifically accurate to label as silicosis the pulmonary dust disease which occurs in coal miners.

Yours, etc.,

GORDON C. SMITH.

Division of Industrial Hygiene,
Department of Public Health,
Sydney.
March 29, 1945.

Post-Graduate Work.

A CINEMATOGRAPH FILM AFTERNOON AT SYDNEY.

THE New South Wales Post-Graduate Committee in Medicine announces that two talking films will be shown at the Stawell Hall, Royal Australasian College of Physicians, 145, Macquarie Street, Sydney, at 4.15 o'clock p.m. on Wednesday, April 18, 1945. The films are as follows: "Caudal Analgesia", to be followed by a commentary by Dr. R. Mackey; "The Use of Forceps", a talking film by G. B. de Lee, of Chicago, to be followed by a commentary by Professor B. T. Mayes.

There will be no charge for admission, and anybody requiring further information should communicate with the Secretary of the Post-Graduate Committee, 131, Macquarie Street, Sydney. Telephone: B 4606.

A LECTURE ON HEAD INJURIES IN SYDNEY.

THE New South Wales Post-Graduate Committee in Medicine desires to announce that Surgeon Captain Lambert Rogers, R.N.V.R., Consultant in Neurosurgery to the Royal Navy, will give a lecture on "Closed Head Injuries and Cerebral Contusion" at the Stawell Hall, 145, Macquarie Street, Sydney, at 4.30 o'clock p.m. on Tuesday, April 24, 1945. All civilian medical practitioners and service medical officers are invited to attend.

National Emergency Measures.

MEDICAL EQUIPMENT.

MEDICAL PRACTITIONERS who are in need of medical equipment and are in doubt whether it can be obtained should write direct to the Chairman, Medical Equipment Control Committee, 31, Albert Road, Melbourne, S.C.2.

Obituary.

JOHN JOSEPH McMAHON.

WE regret to announce the death of Dr. John Joseph McMahon, which occurred on March 25, 1945, at Eltham, Victoria.

ROBERT GRAHAM BROWN.

WE regret to announce the death of Dr. Robert Graham Brown, which occurred on March 31, 1945, at Brisbane.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Conacher, Colin James Ross, M.B., B.S., 1944 (Univ. Sydney), 131, Macquarie Street, Sydney.

Harris, Richard Lalor, M.B., B.S., 1940 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Johnson, Oscar Henry Louis, M.B., B.S., 1944 (Univ. Sydney), Base Hospital, Tamworth.

Books Received.

"Modern Methods of Amputation", by Edmundo Vasconcelos, with an introductory survey of The Development of Amputation by Major-General Norman T. Kirk, M.C.; translated from the Portuguese by Walter Ratto; 1945. New York: Philosophical Library, Incorporated. 10½" × 8½", pp. 286, with many illustrations. Price: $10.00.

"Fourteen Minutes: Short Sketches of Australian Poets and their Work, from Harpur to the Present Day: Based on Wireless Talks Delivered for the A.B.C. in 1942", by H. M. Green; 1944. Sydney: Angus and Robertson Limited. 7½" × 4½", pp. 198. Price: 6s.

"Galen on Medical Experience", First Edition of the Arabic Version with English Translation and Notes, by R. Walzer, 1944. London: Oxford University Press. 9½" × 7", pp. 174. Price: 12s. 6d.

"The Hair and Scalp", by Agnes Savill, M.A., M.D. (Glasgow), F.R.C.P.I.; Third Edition; 1944. London: Edward Arnold and Company. 8½" × 5½", pp. 314, with 50 illustrations. Price: 16s. net.

"Murrell's What to do in Cases of Poisoning", by Harold G. Broadbridge, M.B., B.S. (London); Fifteenth Edition; 1944. London: H. K. Lewis and Company Limited. 6½" × 4", pp. 210. Price: 8s. net.

"Record of Service: An Australian Medical Officer in the New Guinea Campaign", by Bruce Robinson, A.A.M.C., A.I.F.; 1944. Melbourne: Macmillan and Company Limited. 7" × 4½", pp. 183, with 19 illustrations. Price: 6s. 6d.

Diary for the Month.

APR. 10.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
APR. 10.—Tasmanian Branch, B.M.A.: Ordinary Meeting.
APR. 13.—Queensland Branch, B.M.A.: Council Meeting.
APR. 16.—Victorian Branch, B.M.A.: Hospital Subcommittee.
APR. 16.—Victorian Branch, B.M.A.: Finance, House and Library Subcommittee.
APR. 17.—Victorian Branch, B.M.A.: Organization Subcommittee.
APR. 17.—New South Wales Branch, B.M.A.: Medical Politics Committee.
APR. 18.—Western Australian Branch, B.M.A.: General Meeting.
APR. 19.—South Australian Branch, B.M.A.: Council Meeting.
APR. 19.—Victorian Branch, B.M.A.: Executive Meeting.
APR. 19.—New South Wales Branch, B.M.A.: Clinical Meeting.
APR. 24.—New South Wales Branch, B.M.A.: Ethics Committee.
APR. 25.—Victorian Branch, B.M.A.: Council Meeting.
APR. 26.—New South Wales Branch, B.M.A.: Branch Meeting.
APR. 26.—South Australian Branch, B.M.A.: Scientific Meeting.
APR. 27.—Queensland Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All Public Health Department appointments.

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